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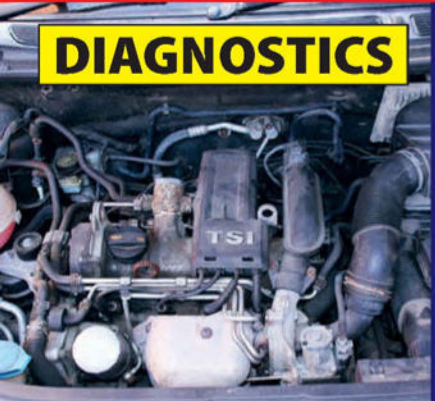

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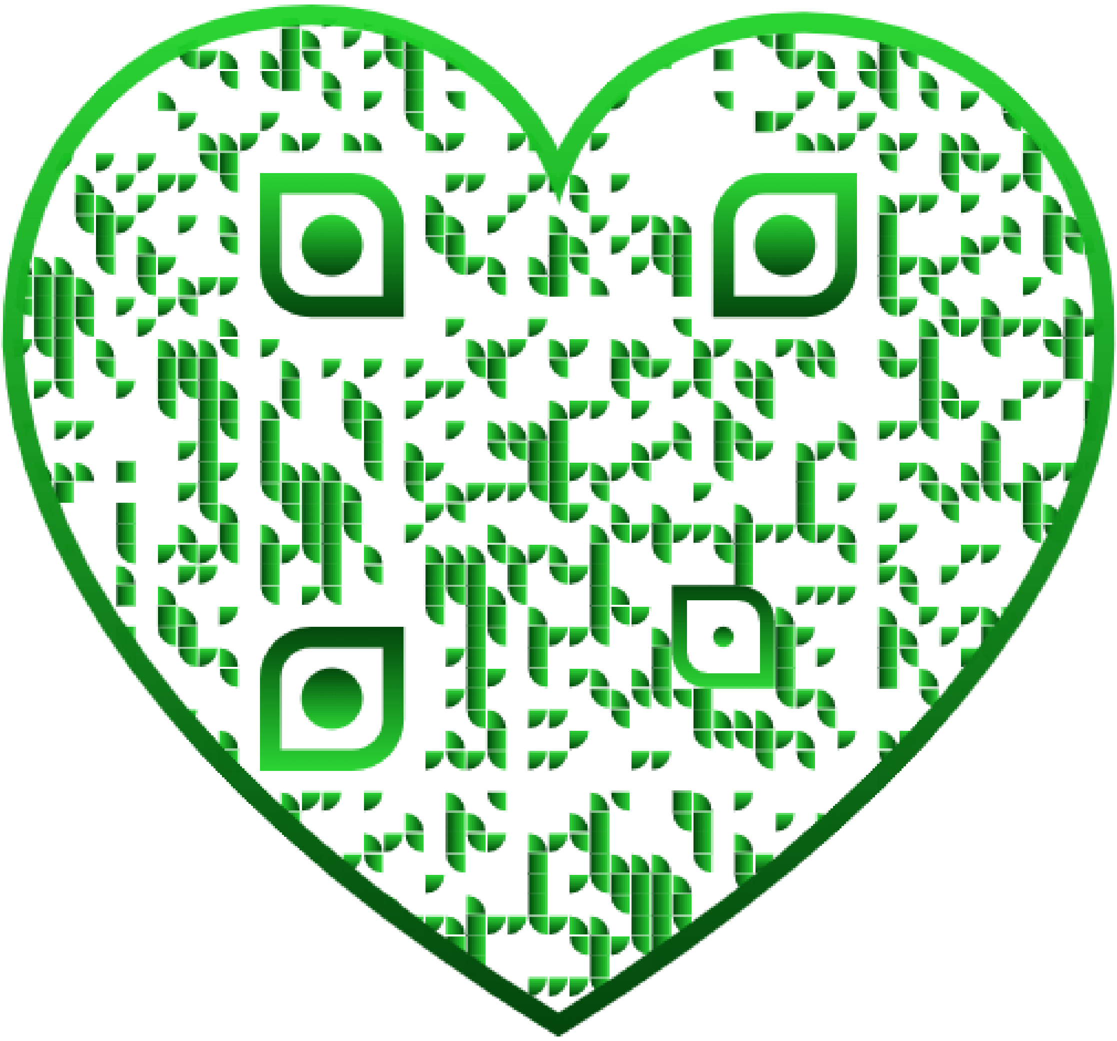


ADVERTORIAL

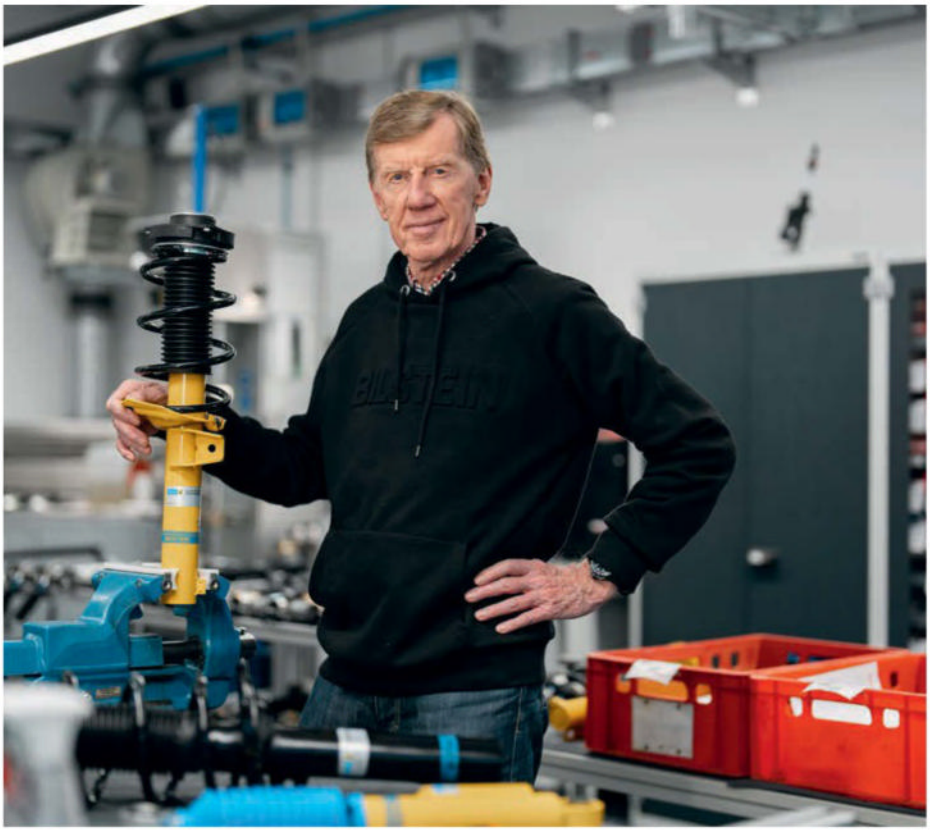
BILSTEIN - “Engineered for Excellence”

Accelerated technological progress and changing consumer demands are both a challenge and an opportunity for car manufacturers. BILSTEIN, as a long-standing partner of vehicle manufacturers, also takes this into consideration. After all, the brand stands for outstanding OE expertise, which is equally reflected in the aftermarket. Premium quality, extensive testing and durability are the foundation of every BILSTEIN technology.

With the new “Engineered for Excellence” campaign, BILSTEIN is sending out a clear signal for outstanding engineering expertise. The focus is on the wealth of technical detail in the shock absorbers and suspension systems, which is reflected in the design and visual presentation of the products. “Our new campaign makes it clear that we are committed to the highest standards in suspension technology”, explains Fabian Okon, Head of Global Marketing Campaigning. “Our partners in the aftermarket can rely on us because OE quality remains our standard.”

The high quality of BILSTEIN suspension parts is also visually documented by a perfect finish.

BILSTEIN has always been a reliable partner for independent workshops. The products are characterised by their outstanding quality and reliability, which enables workshops to offer their customers simply the best. But BILSTEIN goes one step further: with the BILSTEIN Academy, the company offers a comprehensive support and training programme for automotive professionals.



Walter Röhrl has been relying on BILSTEIN for years for optimum suspension set-up.

The BILSTEIN Academy is divided into two strong areas: Education & Training and Technical Support. In the area of training, BILSTEIN organises free in-house training courses for workshops and offers numerous online courses that are available 24/7. The content ranges from shock absorber production to installation in the areas of series production, tuning and motorsport.

The BILSTEIN Academy’s technical support is available to workshops and dealers at all times. Workshop professionals can contact the team by e-mail or by phone, even if the vehicle is on the lifting platform and information is needed quickly.

BILSTEIN takes a holistic approach to its partnership with workshops and therefore supports them not only with high-quality products and training, but also in the area of communication and with advertising materials. As part of the “Engineered for Excellence” campaign, BILSTEIN is targeting its communication specifically at workshops and is ensuring a clear and direct approach on all relevant channels. The focus is on knowledge transfer and technical expertise. Workshops benefit from free training courses that offer deeper insights into the technologies and added value of the products.

“Engineered for Excellence“ is the main requirement in the specifications for every BILSTEIN suspension product.

With this campaign, BILSTEIN is not only making a clear visual statement, but also strengthening direct communication with its partners – for more transparency, expertise and even closer collaboration. By providing communication and advertising material, BILSTEIN is helping workshops to advise their customers even better and convince them of the quality of the products. This holistic support shows that BILSTEIN understands the needs of workshops and supports them in all areas of their work.

Further information can be found here:
workshop.bilstein.com/en/engineered-for-excellence/

Editorial

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Failed head gasket

▶ Trawling through auction cars (like I do most days), I've become aware of a particular vehicle that in a few cases is classified as a non-runner. Its fault is a failed head gasket – although there could be other faults. Believe it or not it is the MG ZS 1.0T. Just like the old MG/Rover K-series days!

A 3-cylinder turbocharged Gasoline Direct Injection engine, co-developed by MG Motor UK parent company SAIC Motor and General Motors. I believe this engine is used in certain Vauxhalls like the Corsa and Astra, but so far I've not seen any listed as non-runners with head gasket failure.

The ZS lacks a coolant temperature gauge on the dashboard, so if coolant does escape, you will be notified by a dash warning light. Which might be too late for the engine to survive thereafter.

There are other issues with this 999cc engine too. Right now, I'm looking on the BCA app and I can tell you a 69-plate MG ZS 1.0T GDI with DCT (dual clutch gearbox) is a non-runner at 35,175 miles. The description says: "stretched timing chain"... "no guarantee only faults". It has had four owners and only one stamp in the service book at 12k. If that's the only servicing it has had, then we can't really sit here and complain about it going wrong – these 3-cylinder engines do require regular dipstick checks. And they need servicing annually.

But I've seen head gasket non-runners in the past with listed service history and what I would call low mileage – 20-odd thousand with a blown head gasket seems unreasonable for a modern engine. The 1.0T was only used in the ZS range of MG Motor UK cars.

Or are these downsized 3-cylinder engines not up to the job? The ZS is classed as a crossover SUV vehicle, so should it really have a 1.0-litre unit fitted?

The 1.5 naturally-aspirated VTi four-cylinder could be fitted in the ZS (as used in the MG3). This gives the SUV near equivalent 0-60 times to the 1.0T but it needs a good thrashing to get power out of it. The 1.5 seems to have a better reputation for reliability. Poor maintenance will, though, result in stretched timing chains among other issues with engine running.

Plus, of course, the ZS EV has sold here since 2019 – and by all accounts, gives no problem at all.

Do you run a 1.0T in either the MG or Vauxhall? Let us know if you have heard of, or seen, any engine problems yourself.

Lock-up garages

▶ I've rented lock-up garages since the late 1980s, when I had a garage with the flat I bought, but later found other residents willing to rent out their garage to me. Too many cars of course was/is my problem. I had four cars most of the time in the early 90s. My excuse... I was working on *Practical Classics* magazine at the time – why shouldn't I have plenty of cars hanging around?! Little has changed over the years. I've reduced my rented garages down to one, but since moving from that location (about 10 miles from Westminster) in 2013, I've searched locally for another.

Last month I noticed a lock-up for rent about two miles from here. I called the number and arranged to view the garage with the (new) owner, who had only bought it a month earlier. He was having trouble locking the garage door when we met, so he said he'd get his mate to look at it. But he went one better... he sent me an image of a new garage door in place. Plus, he wanted to paint the interior walls white before I moved in. Nice chap. I wasn't going to complain.

I've moved in now (not personally), and really pleased thus far. The Focus Mk2 was tested for size, and it went in OK. Plenty of room at the front with the boot near the back wall. I've placed spare tyres on the back wall to act as a buffer (if required).

The Focus has now made room for my MINI Convertible (R52), which is chassis number 13 off the production line.

I bought this MINI from BCA a few years ago and it has sat outside since. Now, it can be dry in this new lock-up. One day I'll get round to rejuvenating it, ready for the road again.

Renting this lock-up has created one space on my driveway, so I can now fix other problematic cars here. Talking of which, my dependable 2003 Skoda Octavia 1.9 TDI went bang the other day. The top intercooler pipe came off under hard acceleration! Managed to limp home with smoke billowing from the exhaust. More jobs to fix!

Do you rent a lock-up or two? Could you be without one? Contact me via email (above).

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We are sorry, but apart from material sent to *Help!* or *Diagnostics Doctor*, not all correspondence can be replied to personally, though everything is read carefully. Emails will be treated in the same way as ordinary mail – the editor is not normally available to provide instant replies.

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The Peter Simpson COLUMN

Is addiction to spray starting products a myth or a fact? Peter looks at a few of the conflicting facts.

▶ As many of you probably know, my involvement with *Car Mechanics* magazine began some time ago, but it wasn't until a few days ago that I realised it's now over 30 years since I joined the magazine staff as Editor back in 1995, having been a freelance contributor for four years previous. These days my 'day job' is writing about old vans and lorries as Editor of *Classic & Vintage Commercials*, and while there isn't generally that much crossover between *CVC* and *CM*, occasionally something comes up which does have a connection.

One-such occurred recently. As part of our coverage of the 60th anniversary of the Ford Transit, we talked about the famous/infamous Ford York diesel engine. This was Ford's own diesel and from 1972 replaced the bought-in Perkins powerplant. Ford in general didn't really like using major components manufactured by outsiders, and the Perkins units were underpowered in the Transit. It was also the same unit as arch-rivals Bedford used in their CA van and, from late 1969, its CF replacement.

Initially, the York engine was well received; a useful increase in power and because it wasn't overstretched, it could be more economical when driven sensibly. However, it had an unusual cold-start system which, rather than conventional glow plugs, used a single heater within the air intake. A great idea in theory, but in practice completely ineffective on cold winter mornings.

Within a couple of years of its launch, the York engine had acquired a fully justified reputation for difficult cold-starting. My first job on leaving school was with a Hastings builder's merchants who used a Ford A-Series (basically an enlarged/lengthened Transit) for local deliveries. This had a York engine and between November and February rarely started without a tow from one of the firm's D-Series tippers.

For most drivers, the essential kit carried in the cab included a can of spray-starting substance – the stuff you spray into the inlet manifold while someone else churns the engine. In time Ford acknowledged that this had a somewhat crucial role in the York engine starting process. They did this by offering as an optional extra and a retrofit for older vehicles, a 'Viso F' cold-start kit. This worked by introducing a 'special starting fluid' (presumably something like Easy Start) into the inlet manifold via a pump-switch on the dash. This improved matters, but it wasn't until 1978 when Ford replaced the manifold heating system with conventional glow plugs, that the York starting issues were finally eliminated. As usual however, the poor-starting reputation took rather longer to dissipate.

Anyway, the topic which came up in the *CVC* letters pages was 'addiction to starting fluid'. This is, as the name suggests the idea that if an engine is started using Easy Start or similar many times, then eventually it becomes unable to start without it. This topic was also discussed in *Car Mechanics* back in, I think, the late 1990s, but without reaching any real conclusion. The big difficulty with proving or disproving addiction is, of course, that an engine which needs it is likely to be in poor condition anyway, and might well therefore become increasingly harder to start irrespective of what is sprayed into the inlet.

However, the recent discussion in *CVC* has produced a couple of interesting responses that I'd like to share here. The first, was told by his father (who had significant experience of diesel engines in forestry work) that products like Easy Start burn very hot and explosively, and while this is exactly what is needed to get a reluctant engine to move, over time the hot-combustion blasts past the piston rings, scoring and damaging the bores in the process. This, of course reduces compression meaning the start-spray is needed more often.

And of course, once blowback like this starts, it advances quite quickly until eventually compression is too low to start without the magic spray. Thus, apparently, was a particular issue with Perkins P4 diesels, though of course it could equally apply to any diesel.

The other comment also related specifically to Perkins engines but in this case it was the P6, though again it could apply equally to others. The P6, incidentally, is/was an indirect diesel. Here, the issue was that the high-temperature ignition caused damage to the injector tips.

These are certainly two very plausible reasons why addiction to spray-starters might well be more than an urban myth. Any further feedback would be welcome. But before signing off, I can't end any piece about easy-start type products without referring to the version that is made and sold in Australia – I probably shouldn't name it in print, but there's a photo of it here. I don't think it's currently available to buy in the UK, and being aerosol-based, postal imports probably aren't possible.

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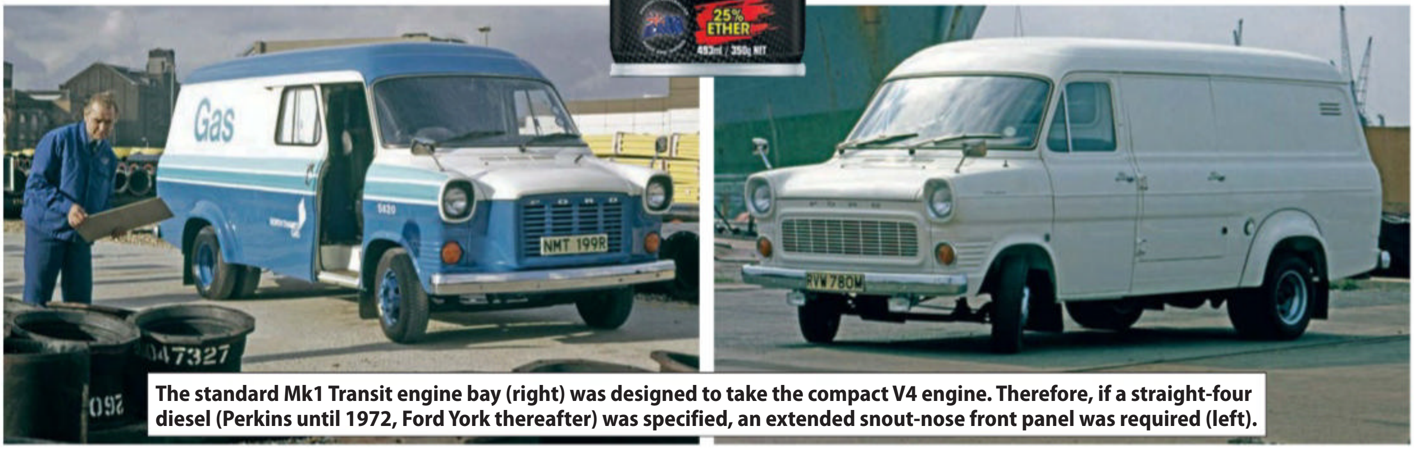

The standard Mk1 Transit engine bay (right) was designed to take the compact V4 engine. Therefore, if a straight-four diesel (Perkins until 1972, Ford York thereafter) was specified, an extended snout-nose front panel was required (left).

INSTANT EXPERT

RUSTPROOFING

THE LONG-TERM INVESTMENT

While modern cars are better protected than those of 50 years ago, **Rob Marshall** investigates why corrosion is a growing threat and examines what you can do about it.

Admittedly, today's typical motorcar does not celebrate its fifth, or sixth, anniversary with a tickle from a welding torch. This is intentional. To help preserve residual values, warranty claims and their reputations, manufacturers have spent many millions of pounds enhancing corrosion resistance. Galvanised steel has become commonplace. E-coatings ensure that the protective primer penetrates all nooks and crannies inside bodywork cavities. Improved paint materials, the addition of cavity waxing, seam sealer and anti-stone-chip coatings have also helped. Considerate body design has reduced the number of common rust traps and plastic splash liners have made a noble contribution to keep the metal covered.

The not-so-obvious enemy

Yet, corrosion has not been banished completely and is becoming a growing issue. An explanation might be that some manufacturers have become complacent; not all vehicles are as well protected as others. Paint on the outer panels has also become thinner. Furthermore, many manufacturers avoid applying top coats to areas away from plain sight. Sometimes, all that protects the bare metal within the engine bay, on the bulkhead and even floorpan, is primer.

Furthermore, it is not easy to tell at first glance whether, or not, a modern car is terminally rusty. Frilly door bottoms, holed wings and rotten sills are not as obvious as they once were, especially as lower panels on many cars are clad with plastic covers that even an MOT Tester cannot remove – unless they fall off, of course.

Rust is not just a problem confined to old cars.

THANKS TO

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Galvanising – not the forever answer

In many cases, saving costs on paint tends not to have short-term consequences, because the metal beneath is galvanised. While galvanising bare steel is, probably, the best way of enhancing corrosion resistance, many people presume that the vehicle will never rust. This is a mistake. Galvanising is a sacrificial metal coating (usually zinc) that corrodes instead of the steel. Yet, when the galvanising coat is depleted, the steel becomes exposed. The rate at which this occurs varies. It can take many years but, more importantly for the carmaker, it lasts sufficiently long for them to offer lengthy anti-corrosion warranties.

A further issue is that several methods of galvanising exist, some of which last longer than others. Whichever type is used, the welding process, employed when the body is assembled, burns away some of this coating. Finally, consider that UK cars are getting older. Owners are delaying upgrading and are prepared to spend more money on routine repairs to keep their existing vehicles running. While new car prices continue their upward trend, many used car prices have increased, too. This is due to a variety of factors, such as reduced new car supply, the pandemic, microchip shortages and elevated cost-of-living.

Why is it worth taking action?

Many *CM* readers own older vehicles in good condition, realising that it is more economical and environmentally beneficial to keep a car running for as long as possible. While this magazine recommends taking preventative action before serious mechanical failure results, this principle applies also to bodywork.

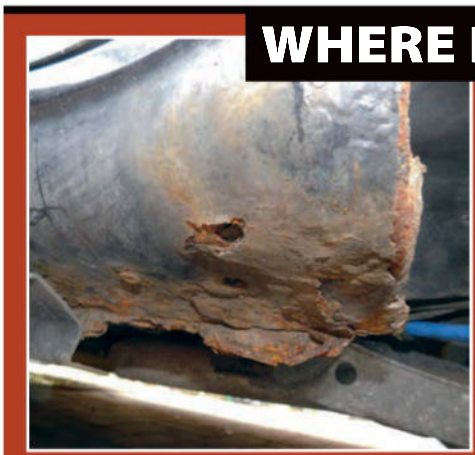
Regular maintenance is key. Frequent washing should extend the life not just of the outer body but also the underside, especially during winter. Hosing is a good idea; power washing is better, provided that you do not force water into places where it could cause problems. Car underbody extension lances are available for some pressure washers, which makes a typically messy and uncomfortable task more bearable. Regular hosing of salt and mud deposits will reduce the rate of corrosion and will allow you to check if any rust has started, before it spreads.

Yet, cleaning alone is insufficient. To reduce the chance of further corrosion, you need to seal the metal surface from moisture and the air.

What is rust?

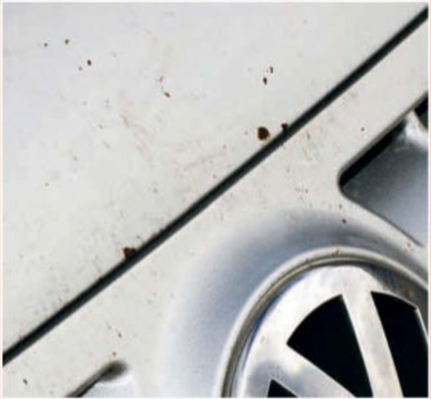
▶ Steel is a man-made material. Its main natural constituent, iron, is mined from the ground as an impure ore, rich in iron oxide (rust). In the blast furnace, energy and oxygen are introduced to create steel. However, this new material has the natural tendency to return to its original form under the right conditions. To ensure this chemical reaction, both moisture and oxygen are needed to release both heat and the brown iron oxide from the steel surface. As steel is denser, a surprising quantity of iron oxide can be created during the corrosion process. This explains why a large quantity of rust flakes can be liberated from a surprisingly small piece of metal. Higher temperatures, more acidic/alkaline conditions and the presence of salt speed the rate of corrosion considerably.

WHERE DO MODERN CARS RUST?

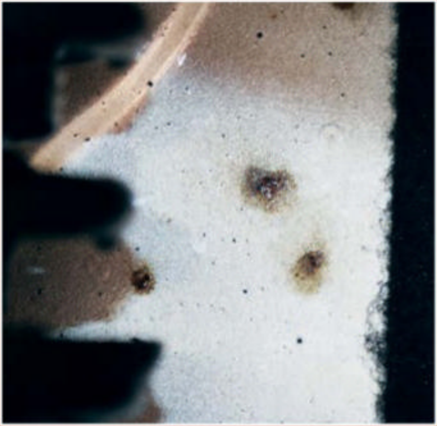


◀ Corrosion tends not to be obvious. A reason for this is the considerable quantity of plastic cladding that can hold salty mud against the metal until rust takes hold. It is not a bad idea to remove plastic guards, clean them out, attend to any corrosion and wax the area before replacing the covers. This sill end is so corroded that welding repairs are needed.

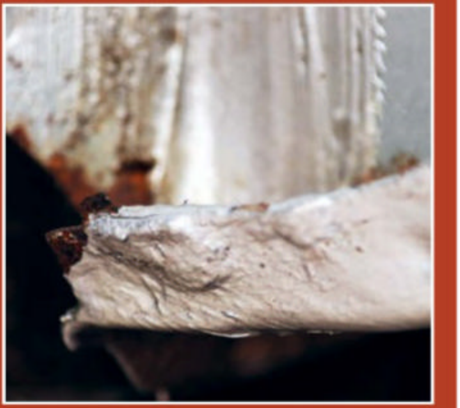
▶ Some cars possess linings that not only act as splash guards but also sound-deadening. These types can absorb moisture and hasten rusting. It is worth removing these types at least annually and waxing the metal behind.



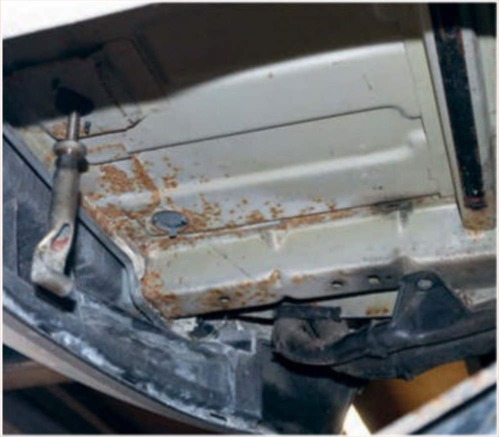
Flying stones are very effective at chipping paint away, both beneath the vehicle and on the outer panels. The chips on this bonnet have rusted and must be addressed, before they spread.



Rust can start within spot welds. This tends to be because protective coatings on the bare steel are burnt away, due to the high temperatures involved with fusing panels together.

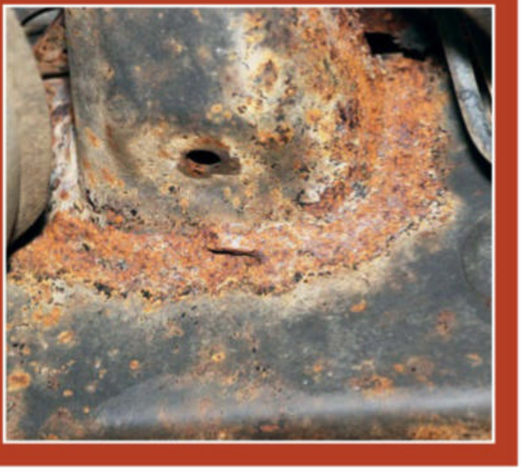


When two pieces of metal are welded together, moisture can seep between the seam and start corroding. The resultant expansion causes the area to swell. Accessing this type of corrosion is very difficult.



◀ The boot floor tends to be more vulnerable to corrosion. Being further away from the engine (in most cases), the area takes longer to dry out. This is not helped by detritus being flung rearwards from the road wheels. Here, you can see that factory primer is all that is protecting the steel and rust is starting to take hold.

▶ Rust also can form around factory seam welds. A possible reason for this is that the surface is uneven, making it harder for basic coatings to adhere satisfactorily. This level of corrosion is superficial.



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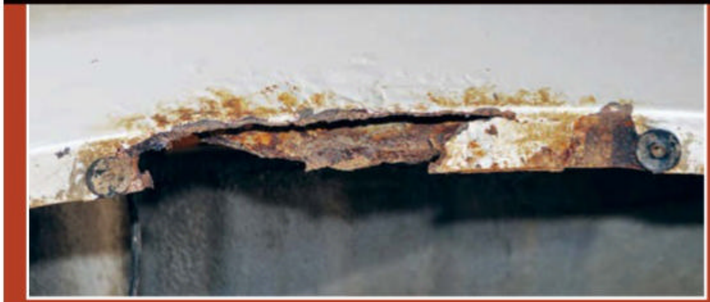
WHERE DO MODERN CARS RUST? CONTINUED

ROB'S TOP TIP

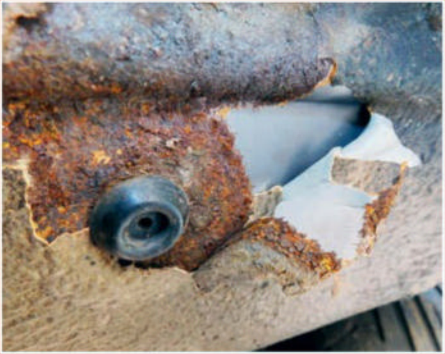
Avoid coating areas that become very hot, such as exhausts.



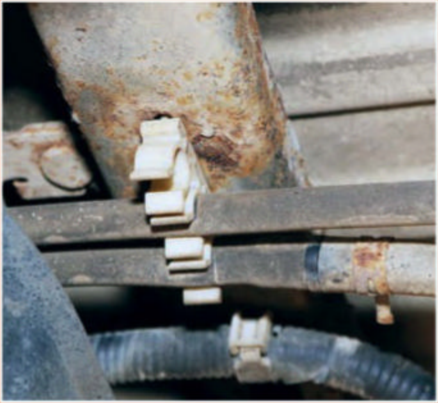
This is a major cause of rear wheelarches corroding away. Moisture and dirt become trapped between the inner and outer panels, causing them to rust from the inside, out.

Corrosion spreads beneath the paint, too, causing this bubbling effect. A repair to rust beneath the top-coat is more complex and expensive, compared to corrosion beneath underseal. Yet, catching the problem early will make the repair more cost-effective, before the damage spreads, making the repair area larger.

The same issue has happened on this tailgate. As dirty/salty road spray tends to soak rear panels that are relatively upright, they can be prone to corrosion. This rust has been exacerbated by the handle trim rubbing against the paint.



Ironically, underbody coatings can also trap water, making corrosion worse. Corrosion started around this rubber bung but the underseal has trapped moisture, allowing the rust to spread unseen beneath it, until the sealer has lifted. Old underseal can dry out, causing the same problem.



Like the bung, fitting plastic clips can chip away protective paint, facilitating a point for moisture to collect against the bare metal. The area around this pipe clip has started to corrode as a result.

The rustproofing methodology

Rustbuster, the specialist anti-corrosion applicator and coatings supplier, based in Spalding, Lincolnshire, advises that there is no single method to tackle rust and protect your car. Yet, when looking at rust prevention, the firm advises that you should establish your goals, because this will dictate the methodology. Should you be a hobbyist classic car restorer, your approach, budget and time limitations will be very different to those of a tradesperson, who uses the vehicle daily and, for whom, cost and time are more important.

A classic car restorer is likely to strip the entire underside of all components, prior to removing every trace of old paint and having the bare metal media-blasted professionally. Presuming that no rust remains, the metal can be sealed with an epoxy-type paint, before receiving body colour and then, possibly, a thin, clear wax preservative.

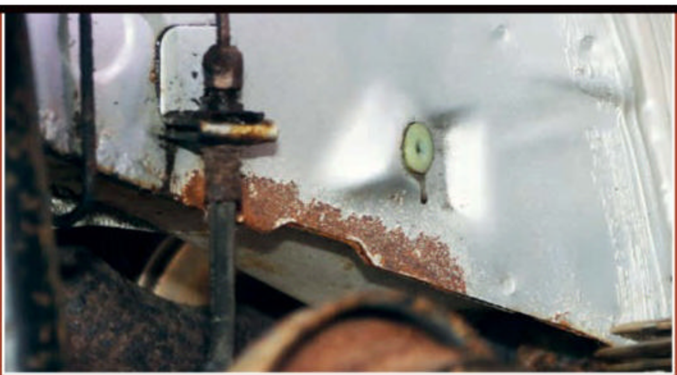
Naturally, this level of work is time-consuming, costly and, in many cases, impractical for the average motorist. Even so, it is possible to extend the life of your car economically, as demonstrated by Rustbuster, using both a 2015 Toyota Hilux pickup truck and a 2004 Ford Puma, as examples.

The sheep dip

▶ Within the last five years, there has been much excitement about lanolin-based maintenance products being applied to the underside of cars – a preventative trend that is popular in Scandinavia. After all, with lanolin being the natural wax that sheep secrete to waterproof their fleeces, it is an effective, natural, safer and more environmentally-friendly waterproofing option than fossil-fuel-based waxes and bitumens.

Rustbuster reports that, while lanolin-based automotive products have gained significant attention in the last few years, it emphasises that these coatings are not rust converters. Lanolin coatings repel moisture and, therefore, are maintenance coatings. Even so, they are so effective that the company has included lanolin rustproofing in its rustproofing range for over 25 years and, therefore, has significant experience with it.

While it admits that lanolin is effective at repelling water from surfaces to which it is applied, including car underbodies, it has downsides. The first is that some people do not like its amber colour, although this settles to a less vivid translucent hue as it ages. Being a maintenance product, the coating needs periodic reapplication, which can be as often as annually, depending on the coating thickness. Rustbuster reports that, historically, many drivers were put off by their cars smelling of sheep for weeks after application. The firm admits that it refines its lanolin offerings to be odourless. A further issue that Rustbuster acknowledges is that this 'trendy' product is also rather expensive. After decades of work, Rustbuster believes that it has resolved all of these issues.



Rust can collect at the lower panel edges. This is because water droplets sit in this area. This area is double-skinned, where two pieces of metal are welded together. If unsealed, water can work its way into the joint.

Seek out rust before it spreads and makes the repair more involved and expensive. Water seals can trap water on the metal lip, as seen here. This damage has just been caught in time.

Any steel part is vulnerable to corrosion, if within the vicinity of the road wheels. While much of this steel fuel tank filler neck is protected by a plastic guard, the lower part is not. The necks on some cars (Mitsubishi Lancers spring to mind) lack such protection and, therefore, require extra preventative measures.

Galvanic corrosion can begin, when another metal (such as aluminium) is riveted to steel and the mating surfaces are not sealed, or painted, adequately. Pictured is the point at which a steel bonnet frame is riveted to an outer aluminium skin.

If any welding repairs are needed, do not forget to reinstate any corrosion protection. This might include using seam sealer to prevent moisture from attacking the metal. Once dried, you can consider additional measures, from an epoxy primer to underseal and/or wax.

RUSTBUSTER RUSTPROOFING

1 The underside must be cleaned and decontaminated for any coating to be effective. Rustbuster uses a mix of degreases and its Chlor-x solution, which lifts lingering salt crystals that bond stubbornly to the paint and metal surfaces. This is a worthwhile exercise to conduct monthly, in any case, during the winter.

THE SPEC
COATING
CENTRE
2

2 Ensure that the vehicle is supported correctly, because you will need to venture beneath it. Drive-on ramps are ideal but use them on flat ground. If using a water jet, avoid forcing water into suspension gaiters and steering rack/CV joint boots, especially.

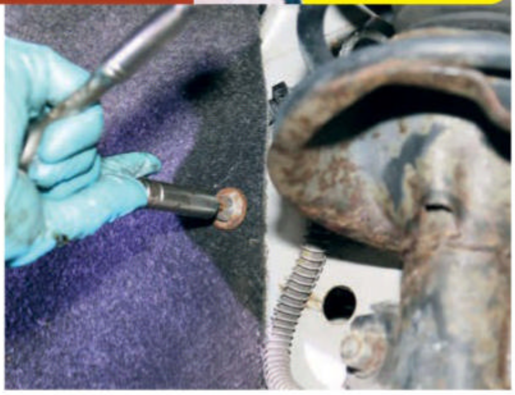
RUSTBUSTER RUSTPROOFING CONTINUED

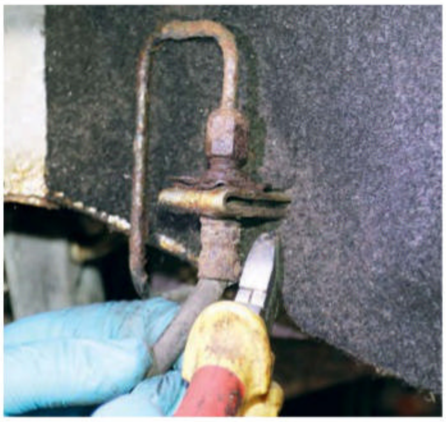
ROB'S TOP TIP

If fitted, remove underslung spare tyre.

3 ◀ Do not forget beneath the wheelarches. To clean the lips of accumulated mud, remove each road wheel and support the car with axle stands. Clean out both the liners and any exposed metal you can see, paying specific attention to panel joints.

4 ▶ Once cleaned, remove the protective liners. These tend to be retained by a combination of metal/plastic fixings. Be gentle to avoid damaging them, although remember that they tend not to be designed to be refitted.

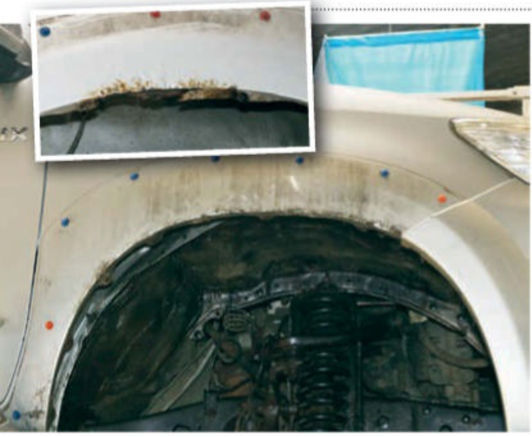




5 It may be impractical (unless you are performing a full restoration) to detach some parts, such as this brake pipe, to remove the liner. Therefore, you may have to cut the moulding to facilitate removal.

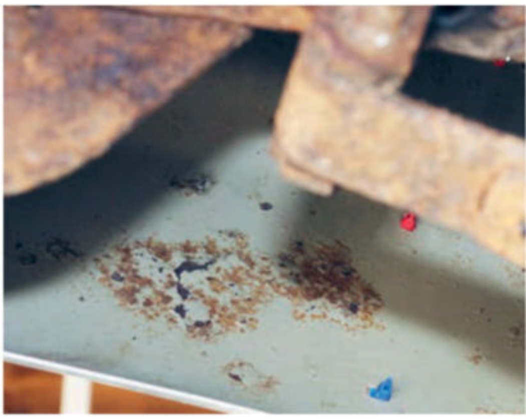
6 Remove the liners and ensure that both sides are clean and dry, before you refit them, later on. Inspect the mouldings for impact damage, cracks and holes that may reduce their effectiveness.

7 Hose out and degrease the exposed metalwork behind the liners and inspect the areas carefully for corrosion. Look also for abrasion damage, where the plastic edges have rubbed the metal and eroded the paint.



8 ◀ Plastic outer wheelarch claddings are especially good at trapping moisture and holding dirt against the metal. When removing them, consider that you might find hidden corrosion, as discovered on this Toyota Hilux. These liners will need cleaning and any corrosion addressing.

9 ▶ Only once the car is dry and the underside suitably dismantled, should you attack the rust. Work on a dry day, with minimal humidity, so you do not trap moisture against the metal. To treat rust, it needs to be exposed. Here, you can see corrosion emerging beneath the paint. This blistered coating is redundant and should be removed.



10 ◀ This is when good old elbow grease is needed. You should remove not only loose and blistered paint but also rust flakes. This stage can create dust, so wear a breathing mask that covers your mouth and nose. There is no need to return the surface to bright, shiny steel. Instead, you can use a chemical rust converter.

11 ▶ Should you discover any weak metal, or even rust holes, you will need welding repairs before venturing any further. There are various types of rust converters available, although many DIYers are familiar with the type that can be painted onto the rust and does not need washing off. Some rust converters might not be effective in temperatures below 5°C, emphasising that rust removal should be done before winter.

ROB'S TOP TIP

Wear decent overalls, eye protection and a mask.

Making your own

▶ Many people do not realise that pure lanolin is relatively thick, possessing, roughly, the same consistency as boot polish, or petroleum jelly, at room temperature. While this makes it easy to apply to metal with a cloth, it is less than ideal for spraying onto a floorpan, or injecting into box sections. Therefore, a thinning solution must be added to make it sufficiently viscous. Sometimes, so much thinning is necessary that the solution being sprayed beneath the car comprises less than 15% lanolin, with the rest, Rustbuster surmises, being a mixture of solvents and vegetable oils.

For better performance and value, Rustbuster gives you the option of creating your bespoke lanolin mix. The following steps demonstrate how this is done.

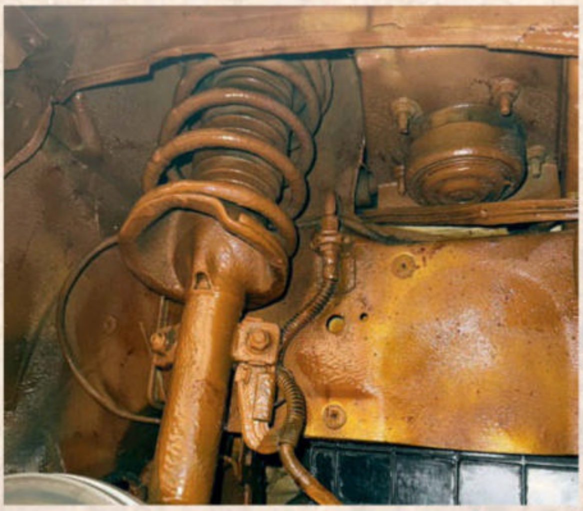
B1 Create your bespoke lanolin-based anti-corrosion coating by mixing Corrolan Pure (comprising 70% lanolin) with Corrolan Turbo. The latter product acts not only as a thinner but also as a carrier that pulls the Corrolan Pure deeper into the surface.

PURE
CORROLAN

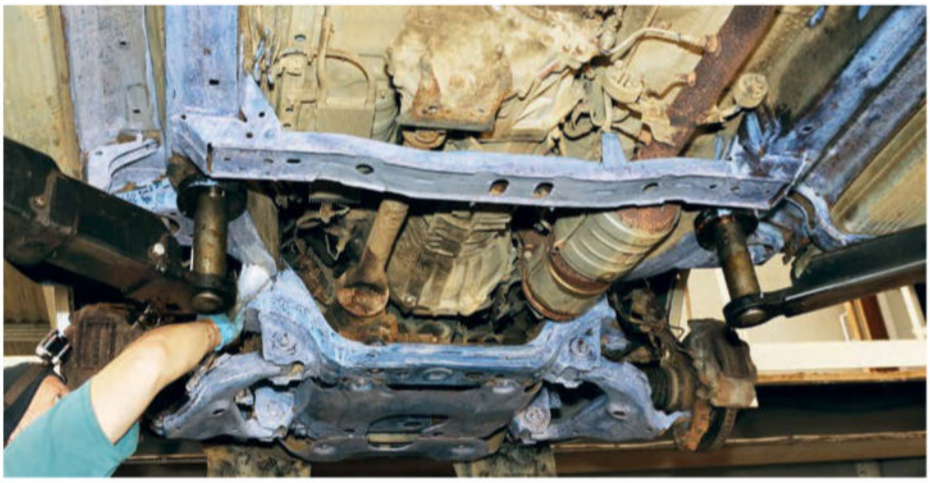
B2 Corrolan Pure will not decant at room temperature. Warm the can, by standing it in very hot water for around 20-30 minutes. Ensure that the contents are warmed and mixed thoroughly, so you do not end up with lumps.

B3 You can also use a measuring tin, such as those used by professional paintshops. Yet, the mixing ratios need not be exact. Add Corrolan Turbo; note how much thinner it is. The two solutions can be mixed with a stirrer.

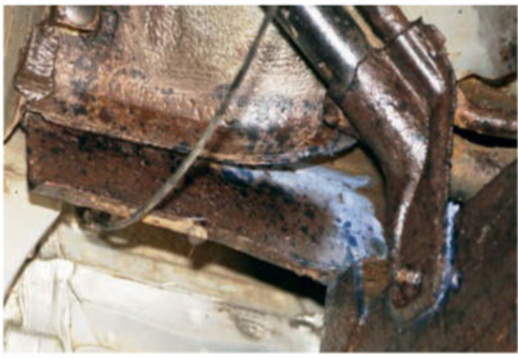
B4 Rustbuster reports that a 50/50 ratio is sufficient for spraying car underbodies with a domestic hand-pump applicator, such as those sold in DIY stores to apply paint to fence panels. Should you wish to create a cavity wax, add more Corrolan Turbo to thin the Corrolan Pure further.



B5 ◀ Rustbuster advises that buying 5 litres of both Corrolan Pure and Corrolan Turbo (total cost being £85.94 plus postage) would be sufficient to coat the underbodies of at least five average-sized cars. Should you prefer not to mix the products, Rustbuster sells pre-mixed 50/50 Corrolan Pure/Corrolan Turbo as Corrolan Penetrator. Alternatively, it sells a lanolin-based cavity wax under the Corrolan Active brand.



12 Rustbuster's FE123 rust converter possesses a creamy consistency. When worked into the rust pits with a clean paint brush, it converts the iron oxide into the more stable iron tannate. As the thick solution dries, it forms a latex binder over the area, sealing out moisture and air. As such rust converters are activated by contact with metal, neither pour the solution into a metallic container, nor return any surplus to the bottle.

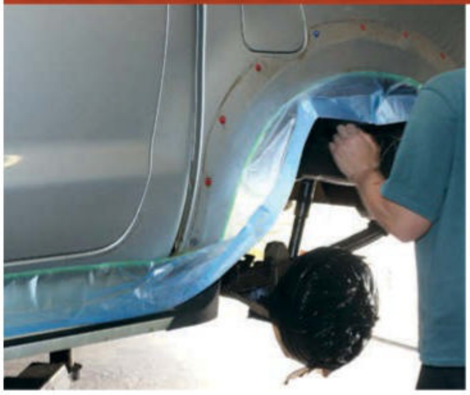


13 Rustbuster warns that such rust converters must be applied to rust, only. It can stain, or even promote corrosion, if applied to bare steel. The chemical reaction is complete, when the brown, oxidised metal turns blue/black. Should the area remain white, the reaction has failed due, possibly, to the temperature being too low, or a contamination (such as grease) preventing the converter from interacting with the metal.

RUSTBUSTER RUSTPROOFING CONTINUED

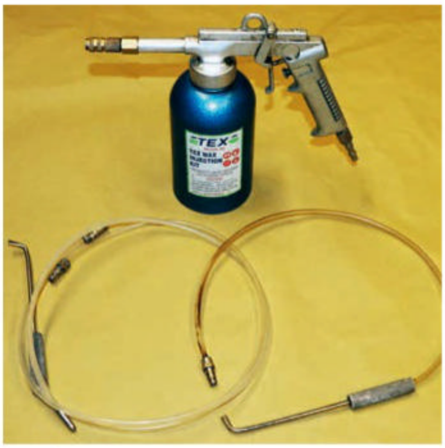
ROB'S TOP TIP

Use floor protection, such as a tarpaulin.

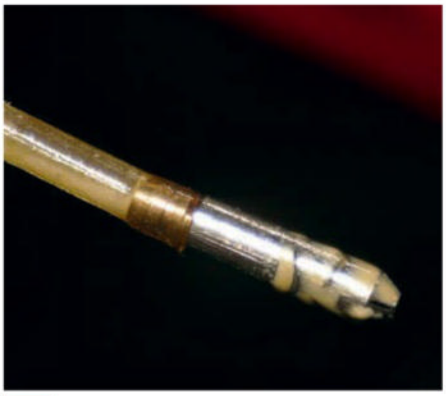


14 ◀ Do not underestimate how far rustproofing overspray can travel. You can buy plastic (or masking paper) and attach it to the lower extremities with a continuous strip of masking tape. Bodywork-grade HDPE plastic coverings are electrostatically-charged, making them easier to mask.

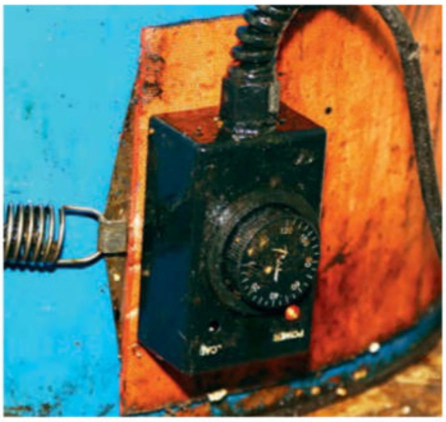
15 ▶ It is wise to cover the upper bodywork, too. A tarpaulin risks scratching the paint but you can buy single-use car covers relatively inexpensively. While the odd speckle of underseal and/or cavity wax will not damage your paintwork, they can create potentially dangerous smears on glazing.



16 You can buy cavity wax in aerosol form but purchase one with an extension probe. Should you own a compressor, consider buying a wax injection kit.



17 The nozzle on the end of the flexible tube is designed to ensure optimum product dispersal, depending on the situation. The pictured nozzle is used by Rustbuster, ensuring a 360° even spread of cavity wax. An alternative is pictured in Step T6.



18 Being a professional outfit, Rustbuster's application centre has cavity wax in a large vat, which ensures that the contents are heated to 40°C.

19 ◀ Box sections, be they separate chassis, or those reinforcing a floorpan, risk rusting from the inside, out. The probe is inserted within the ventilation holes and pulled out slowly, as the trigger is depressed. This deposits a fine mist of wax, which is drawn further into the structure.

20 ▶ Sills are also box-sections. You can either insert the nozzle and tube through drain holes, or gain access through rubber bungs. As a last resort, you can drill 10mm holes and insert blanking bungs afterwards. Rustbuster sells such kits.

21 ◀ Do not forget to cavity wax the subframe(s), using the same methodology.

22 ▶ Outer body panels can corrode from the inside, out. You can spray wax into the hidden regions of these panels, via the water drain holes. Yet, when dealing with the tailgate/boot, take care to ensure that wax does not contact any interior trim.

ROB'S TOP TIP

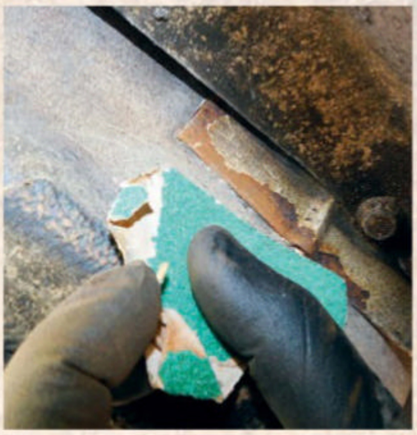
Ensure that overspray will not damage any surrounding property.

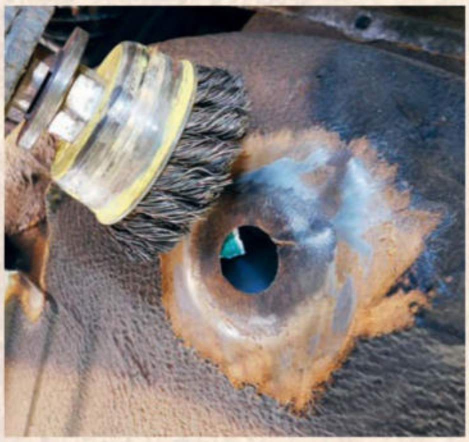
What tools can you use from home?

▶ While professionals have access to equipment that is beyond the reach of most households, DIYers need not invest in specialist tools. So, if you are working from home, what are your options?

T1 This MBX metal buster tool is sold by Rustbuster. While impressive and effective at revealing corrosion, it costs just under £700, plus VAT. Thankfully, there are more cost-effective DIY alternatives.

T2 ▶ A humble paint scraper and even sandpaper (below 60-grit) can remove coatings, too. You can use a domestic heat gun, although be wary of the fire risk. Use a tarpaulin to protect the floor, wear overalls, eye protection and a cap, because underseal removal is a messy task.





T3 ◀ Wire brushes are efficient, when fitted to drills, or angle grinders. However, knotted wire brushes, while effective, can eject sharp wire particles, making it vital that you wear decent eye, face and arm protection. You can consider using a sandpaper flap disc but you risk sacrificing sound metal. With angle grinders being so noisy, consider ear defenders, too.

T4 ▶ The advantage of applying rust converters with a paint brush is that you can work it into the surface pits. Aerosol rust converters have the advantage of reaching areas that a brush cannot.

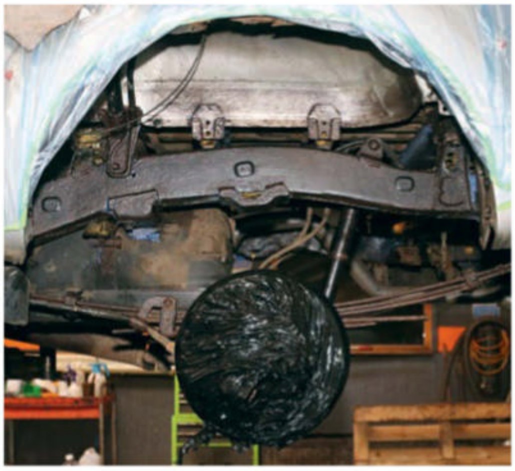
Jenolite
THE ORIGINAL
RUST
CONVERTER
TRIED & TRUSTED
EST.1939

T5 ◀ If you own a compressor, you can buy underseal in one-litre containers and apply it with a Schultz gun, which is relatively inexpensive. Alternatively, you can brush on underseal, or buy it in aerosol cans.

T6 ▶ Like underseal, you can buy good quality cavity wax in aerosol form, although check that an extension probe is supplied as an accessory. Alternatively, you can buy wax injection kits that can be used with a compressor. Pictured is a wax application lance, noting that such kits possess flexible extension hoses, much like the one pictured in Steps 17 and 22.

23 ◀ Rust within doors tends to start between the frame and skin, within the panel. If you cannot access the inside via the drain holes, you have the option of either removing/refitting any factory bungs, drill holes discreetly (as per Step 19), or removing the trim panels to gain direct access. If using cavity wax of the correct viscosity, you should not block the water drains.

24 ▶ This surface is ready to accept underseal. The rust converter has dried and the iron oxide has been treated effectively. Note that the brakes have been covered with a plastic sheet. It is advisable to do the same to exhaust systems.



⇨

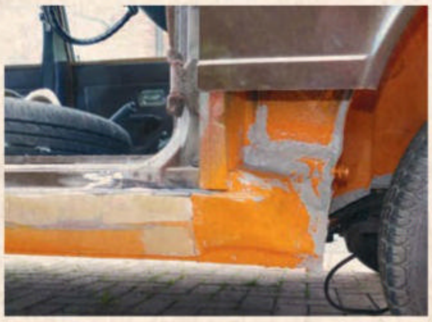
ROB'S TOP TIP

Expect cavity waxes to drip from the car for several days after application.

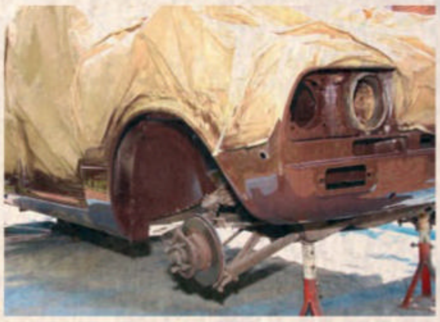
Epoxy paints

▶ Space precludes us from covering anti-rust paints in detail. Generally, they are not a consideration for the undersides of everyday cars but they are relevant for outer panels. Generally, primers (including acid etch types) are porous; the exception to which are epoxy-based primers that provide water barriers. Subsequent layers of primer assist top coat adhesion. Epoxy mastics differ, generally, by being far thicker. Rustbuster tells us that its Armaguard Epoxy Mastic formulation has the advantage of possessing a low surface tension, ensuring that the paint flows into surface pits. This reduces the chance of air getting trapped between the metal and the paint, which encourages rust that will cause the paint to lift and peel.

C1 Epoxy Mastic is a two-part product, meaning that you need to mix two products so that the product can cure chemically.



C2 Available in a variety of colours, orange epoxy mastic has been applied to the replacement sill and the wheelarches on this car. It creates a very tough barrier that adheres to the metal even better than stone-chip paint.



C3 A major advantage of epoxy mastic is that it can be overpainted in body colour – which is just as well, because it lacks long-term ultraviolet light resistance. In addition to the wheelarches, the lower front panel was painted in epoxy mastic, too.

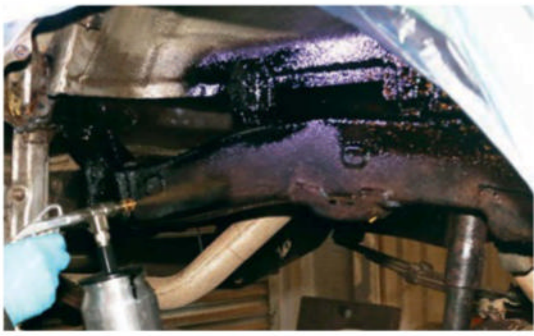
RUSTBUSTER RUSTPROOFING CONTINUED

Techshield
UNDERBODY WAX
Rustbuster Ltd
Spalding
England

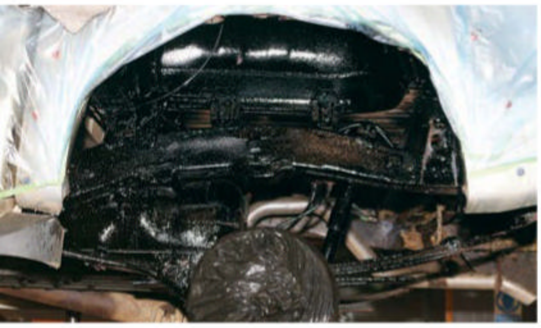
25 ◀ Like cavity wax, underseals should be heated for optimum results. As they are flammable, never use a naked flame. Utilise indirect heat, instead. This hot plate is a safe method. Alternatively, place the can in a bucket of very hot water.

26 ▶ This professional applicator requires the warmed underseal to be poured into a pot, after the contents are shaken to mix the ingredients. Alternatively, these one-litre cans can be screwed directly to a Schultz gun. Should you lack a compressor, you can buy underseal in aerosol form, although thicker alternatives are available that can be brush-applied.

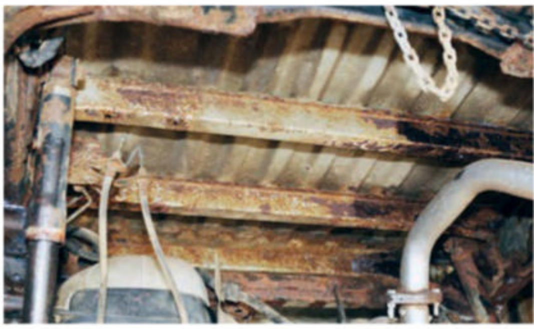
27 ◀ Read any instructions. This product is applied at 5-6 bar of air pressure, building up several coats with a finished film thickness of 5-6mm. Apply underseal to the backs of the outer panels, then the nooks and crannies...



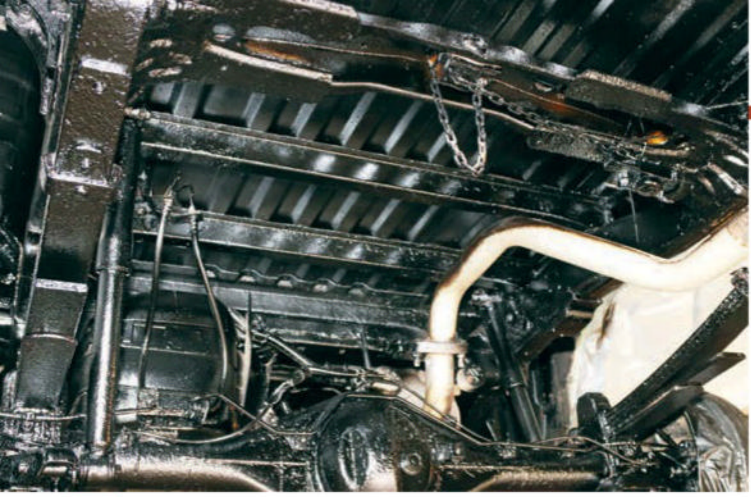
28 ▶ ...before coating the more easily-accessible flat surfaces. You will need to apply several coats to achieve the required film thickness for optimum protection. Your applicator's spray pattern should be sufficiently accurate to give you precise control – it should not blast everything in sight.



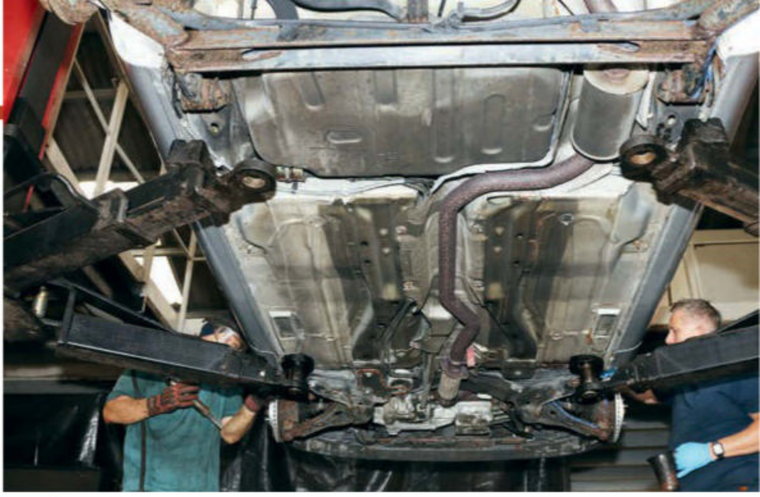
29 ◀ The completed wheelarch has been painted on the other side of the outer panel, too. Inexpensive underseals tend to prioritise cheaper, bitumen-based ingredients, whereas more expensive formulations tend to contain more wax, which ensures the film stays flexible for longer.



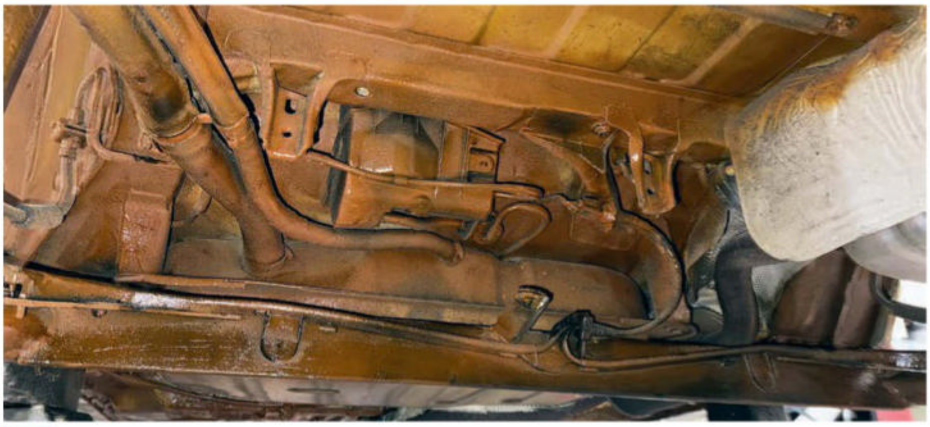
30 ▶ To show the difference that correct undersealing can make, this is how the load bay looked beneath the Toyota before the rustproofing treatment started.



31 This is the final result. While it looks much better, the main aim is to ensure protection. This treatment has increased the Toyota's lifespan by years.

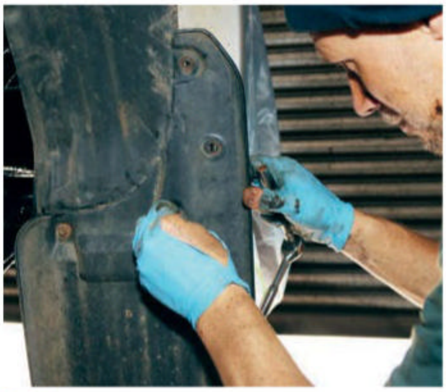


32 This is how the Ford Puma's underside looked, before treatment. Instead of underseal, the owner selected a lanolin-based treatment, instead of a black underseal.



33 The amber-coloured lanolin-based coating might not be to everyone's tastes but the aim is to provide high-quality water resistance, not Concours trophies. Lanolin-based treatments are known to soften certain rubbers, so wipe away any overspray from bushes and hoses.

34 Clean your tools thoroughly. Typically, cellulose thinners will remove cavity wax, underseal and lanolin-based waterproofing coatings effectively from the pots, guns and hoses.



35 After the majority of the solvents have flashed off and evaporated, refit all of the cleaned liners and guards. Note that the surface should remain tacky, so wear gloves and protective clothes.

36 It is possible that you will need some extra clips. Main dealer-sourced clips are expensive but you can buy aftermarket alternatives that are just as effective.

37 Once work has finished, allow the engine to run at idle speed outside, to allow any rustproofing residues that may have contacted the exhaust system to evaporate.

Anti-corrosion warranties

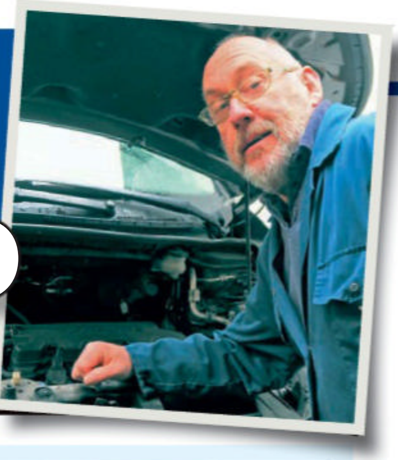
▶ Virtually all cars, made within the last 20 years, came with a manufacturer's corrosion warranty. These tend to be separate from the main warranty and last longer. Yet, they tend to be limited, in that they cover penetrating corrosion. This is defined by rust that has created a hole, by corroding from the inside, out. Surface rust, especially on steering and suspension components, is very unlikely to be covered.

Such warranties come with strict terms and conditions. As maintenance is crucial to rust prevention, evidence of an annual anti-corrosion inspection tends to be mandatory, which should be filed within the service book.

Should your car be covered under warranty and you are considering preventative anti-corrosion work, it may be worth confirming with your main dealer that you are not voiding any remaining guarantees.

Tales from the workshop

Fixing advice from our garage proprietor Steve Rothwell



PEUGEOT 207

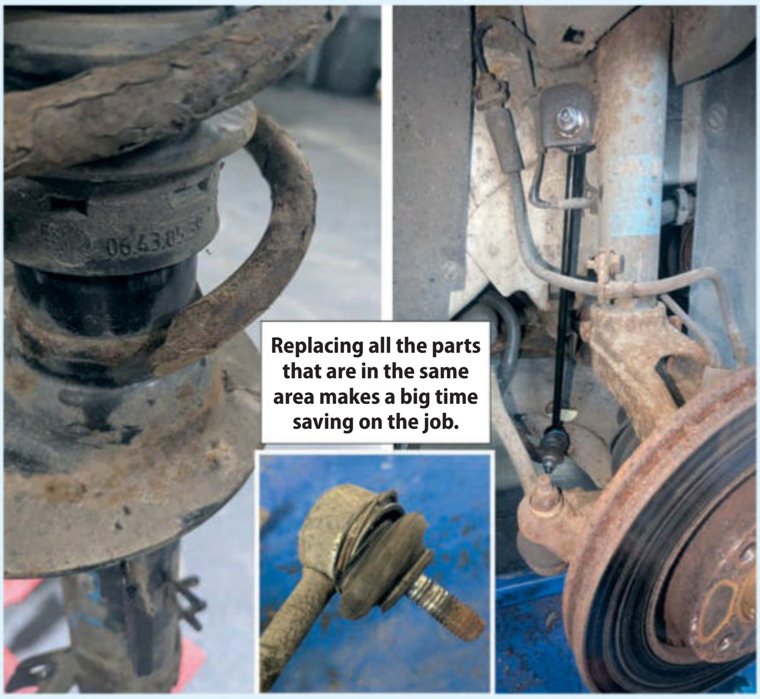
CV boot & coil spring

It's good when all the problems are in the same area and can be rectified together. The broken road spring, the track rod end, the split CV boot and the front link arm that this 2008 Peugeot 207 had just failed the MOT on, were all located at the offside front, and so could all be dealt with in one fell swoop.

The track rod end and the link arm needed to be disconnected to remove the strut and when removing the strut to replace the spring this would also allow easy access to the driveshaft boot. When fitting it all back together the new link arm and track rod end could then be fitted.

The owner had declined the offer to balance up the suspension and replace the spring and link arm on the nearside, as the budget would not quite extend to this.

Once all the new parts were fitted, and the tracking checked and adjusted, the motor did sit nice and level and I was quite happy that the components on the opposite side were still in good order.



Replacing all the parts that are in the same area makes a big time saving on the job.

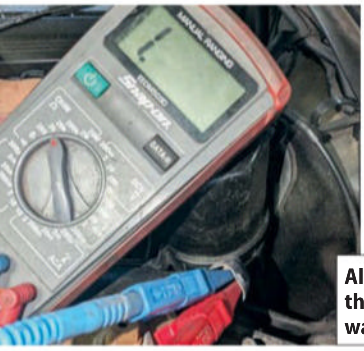
VOLVO 960

ABS sensor test

The ABS light was showing up on this 1999 Volvo 960 3.0 and without the EOBD socket found on later vehicles the method of testing was to use the vehicles own inbuilt self-test system. This necessitates the counting of flashes from the diagnostic unit to determine the area of the problem. With the wires connected as required, the flashes were counted and I arrived at the code of 232. This was indicating that the wheel speed sensor on the right-hand front was not giving the required signal.

It was decided to check the sensor using an ohm meter before condemning – and it was checked to see if the reading through the sensor did conform to the 600-1600 Ω setting that was required. The reading was 1, confirming that the sensor was the source of the problem. The new sensor was sourced and the old one removed. Just as a confirmation, the reading of the new sensor was tested, and this was a perfect 1000 Ω.

Once fitted in place, the Volvo was given a quick drive to confirm that the ABS light was now extinguishing as it should, and all was once again working correctly.



Although the problem did appear to be the wheel speed sensor from the codes, it was good to confirm this using the meter.

HONDA JAZZ

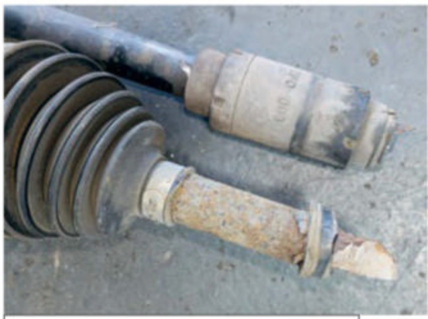
Loss of drive

The failure of a driveshaft is rare, but it can happen, and most likely time for it to happen, will be when its most needed. That was certainly the case when the owner of this 2010 Honda Jazz 1.4 needed to move quickly out of a junction before the approaching traffic arrived.

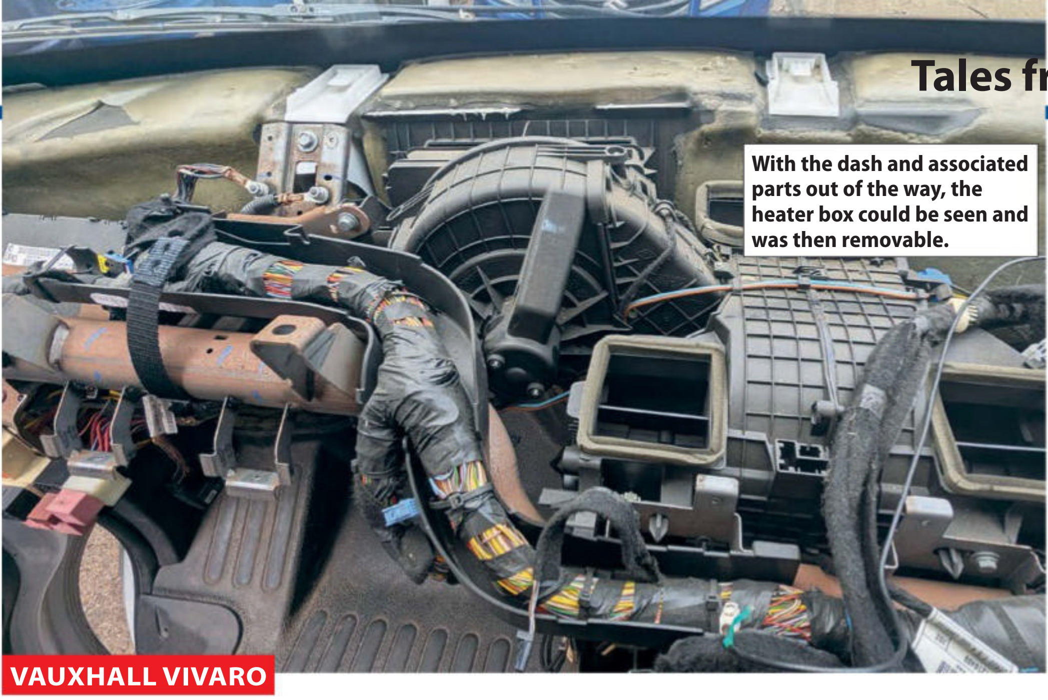
A hard push to the floor with the accelerator pedal and the Jazz shot forward across the junction followed by a roar from the revving engine and the Honda slowing to a halt. Thankfully by this time the motor had cleared the junction and was out of the way of the oncoming traffic, though the Jazz owner was now going nowhere until the recovery truck arrived.

The corrosion that had caused the failure had been occurring for a long time and only after the failure was it spotted. This was because the centre balance weight on the shaft which is enclosed in rubber was covering the signs that would have exposed the impending failure.

The remedy was quick and simple – and a replacement shaft was sourced and fitted putting the drive back in the Jazz.



The centre balance had hidden the corrosion that had been eating through the driveshaft for some time, eventually the shaft under pressure just snapped in two.



With the dash and associated parts out of the way, the heater box could be seen and was then removable.

VAUXHALL VIVARO

Heater replacement = dash out job

The heater matrix on this 2013 Vauxhall Vivaro 2.0 CDTi had been leaking since last winter, but a good addition of coolant leak additive had bunged up the leak. The leak had also had a detrimental effect on the operation of the heater, and the air blend doors were not operating, and the heater blower was sounding decidedly rough.

The heater no longer had the ability to produce warm air in the vehicle and the inevitable time had arrived that the heater unit needed to be looked at properly to get things back in working order again.

This was going to be a dash out job to access the heater box and the owner braced themselves ready for the inevitable costs.

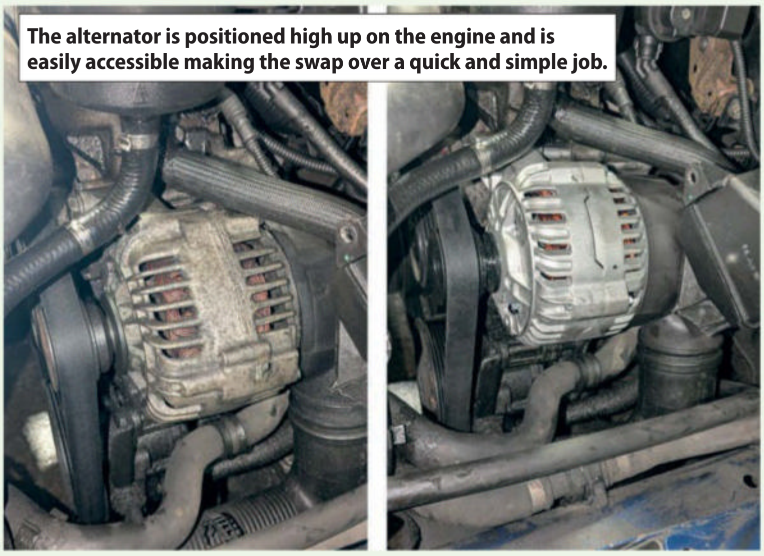
The Vivaro was parked in the workshop and the battery disconnected before starting the task. Once the instruments, steering wheel and dash panels are removed, the heater box is a little more visible and the work of removing it to access the needed sections can begin.

A new blower motor was fitted, and the air blend doors were all cleaned and checked before then reassembling the heater and fitting it back into position.

The reassembly of the dashboard, instrument console and steering column shroud along with the steering wheel could then begin.

BMW 5-SERIES

No charge



The alternator is positioned high up on the engine and is easily accessible making the swap over a quick and simple job.

Probably the words that most of my customers would love to hear, "no charge", but the phase was not referring to the financial retribution for work carried out but was indicating to the owner of this 1999 BMW 528i that the reason the battery was low, was because it was receiving no charge from the alternator.

The good news for the owner was that the alternator on this 2.8-litre petrol engine is situated up high on the engine and has easy access, allowing it to be fully replaced in less than an hour. The bad news is that the depletion of the ageing battery had pretty much drained it to an extent where its serviceable life was reduced, and I did recommend that to prevent any problems it would be a good option to also renew the battery.

The owner did agree, and so with a new alternator fitted, along with the new battery, the 5-Series was turned round and ready to go out before the afternoon tea break.

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FIAT DUCATO

Water loss

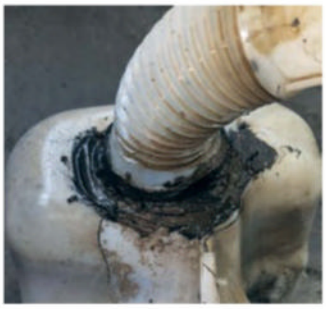
When a customer mentions water loss, the first thought is always the cooling system and where is the water coming from, with the radiator and water pump the most likely candidates.

In the case of this 2009 Fiat Ducato 2.3 diesel, the wet liquid being referred to by the customer was not coolant but was washer fluid – this made tracing the source of the leak much easier and a lot less of an immediate concern. They did at that point offer the advice that the problem only occurred when topping the washer's fluid up, and so at this point all became clear.

To be fair I am pretty impressed when the driver has enough foresight to top-up the fluids under the bonnet between services as many of my customers I'm sure do not open the bonnet from one year to the next.

When I inspected the washer bottle, I could see that not only was it cracked around the top, but a previous attempt had been made some time back to seal the filler tube into the neck of the reservoir.

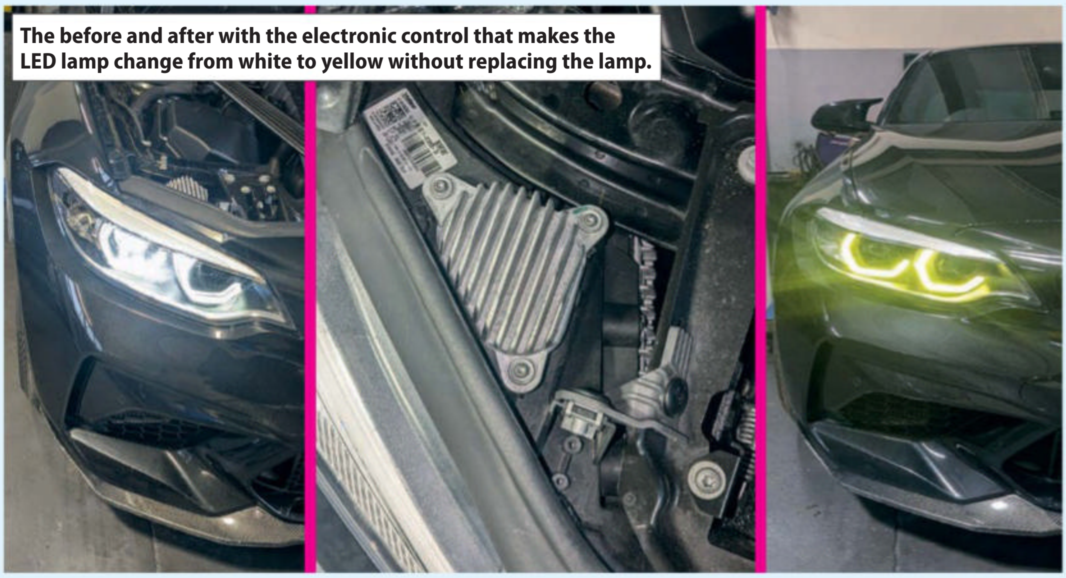
A new washer bottle and filler tube were ordered up, and with the new seal in the filler bottle, the filler and neck were fitted. The reservoir topped up to confirm that the system was now leak free.



The filler neck of the washer bottle had already had an attempted repair made and the only solution was to fit a new bottle with a new neck seal.

BMW 2-SERIES

Yellow DRLs



The before and after with the electronic control that makes the LED lamp change from white to yellow without replacing the lamp.

▶ The yellow daylight running lights (DRL's) are somewhat of a grey area, but the owner of this 2020 BMW M2 3.0 was insistent that they were perfectly acceptable and so I had no problem fitting the driver unit that created the conversion from the white DRL's to the yellow light.

The headlamps and the indicators are unaffected by the change, and it was purely the DRL that now has a yellow tinge.

This trend of demand for the yellow DRL's has been sparked in some ways by BMW who started installing these to the M4 and M3 CSL edition – and this has been copied by some, who when discovering that this is available as a retrofit have been pleased to have the modification carried out. The lighting regulations on the gov.uk website state:

- Article 4.2.3 For front position lamps (DRL's), the following colour of light is acceptable:
- White light – predominantly white light with a blue tinge.
- Yellow light – if combined in a yellow headlamp.

It also states that a non-compliance in this area is a minor, and so this will be noted but will pass the MOT.

With this in mind, I was happy to fit the small unit that turns the original white DRL's into the yellow version.

AUDI TT

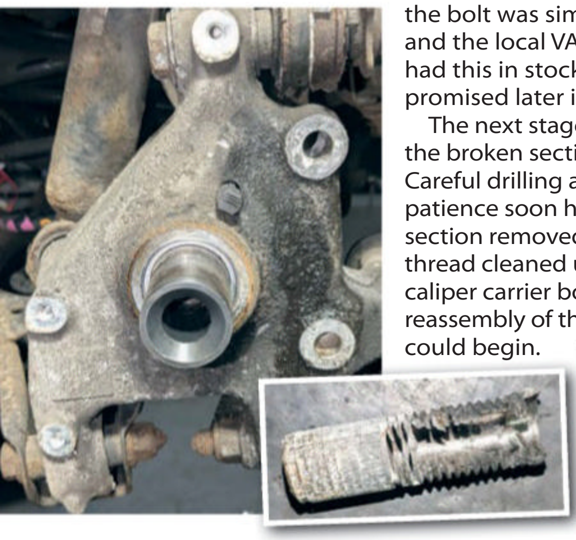
Broken brake bolt

▶ Very often the simple jobs can be the ones that trip you up. This 2014 Audi TT 1.8 TFSI petrol, was in for a quite straightforward brake disc and pads replacement. This would normally be a quick job, in out and turned around and ready to go back out on the road.

The Audi was up on the ramp and the wheels removed, and all the new parts had been delivered and were ready to be fitted. It was when removing the brake caliper carrier that the job took a turn for the worse. The caliper carrier retaining bolt to the hub would not shift, and after a short struggle attempting to loosen the bolt, the bolt sheared off cleanly at the flange.

There were now two parts to the problem, the first was to obtain a new caliper carrier bolt, and the second was to remove the old bolt without damaging the hub. Obtaining the bolt was simple enough and the local VAG supplier had this in stock, with delivery promised later in the day.

The next stage was to remove the broken section of bolt. Careful drilling and a little patience soon had the broken section removed. With the thread cleaned up and the new caliper carrier bolt fitted, the reassembly of the discs and pads could begin.



Once the old broken bolt was removed and the new one sourced the brakes could be reassembled.

MERCEDES-BENZ E-CLASS

Parking brake bother

▶ The problem on this 2013 Mercedes E250 AMG 2.2 diesel, was not related to the efficiency of the handbrake, but the problem that the owner had now found themselves in. The foot-operated parking brake had been applied particularly hard on a steep slope and now the owner had released it by pulling the release lever as required. The problem was that the lever needed a hard tug to release the brake, and the owner had overdone the effort required to pull the lever. This now left them with the handle in hand and although the parking brake was released, they knew that if they applied it again it would not be so easy to release.

The answer was to drive directly to my garage and hand the problem over to me. This was not too difficult, and I was happy to find that our local Mercedes dealer did have the required parking brake release mechanism in stock.

The job was turned around before the end of the day and the owner would now, I suspect handle the release with a little more care.

The release handle for the parking brake had come away in the owner's hand, and this would prevent the parking brake being released if it was applied again.

RENAULT KANGOO

New shoes

Whilst many vehicles now have adopted the disc brake on the rear as well as the front, there are a wide number of motors that do still employ the brake drum and shoes on the rear.

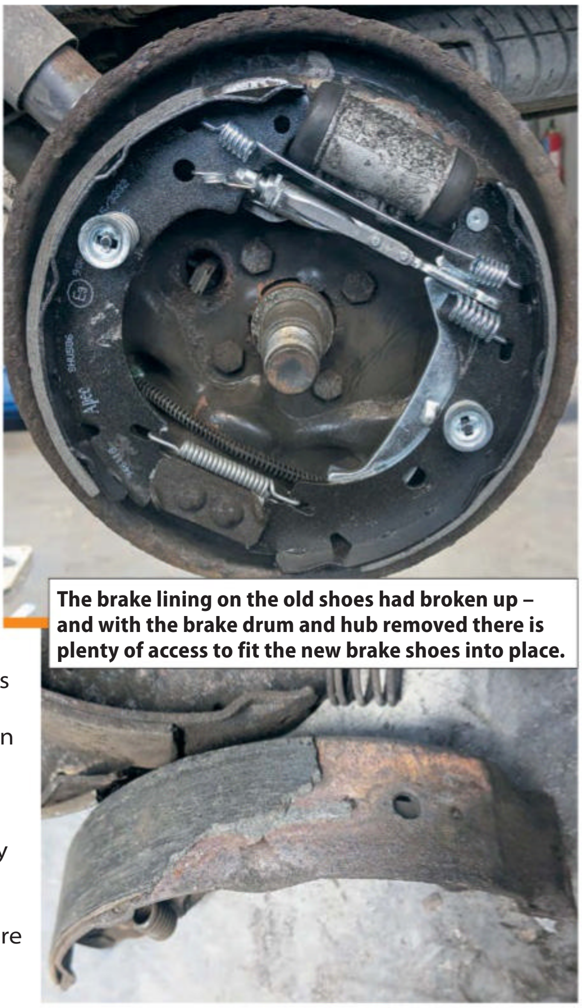
This 2005 Renault Kangoo Expression 1.6 petrol was one such vehicle and when the rear brakes started to emit some strange sounds, followed by a reluctance to release after letting off the parking brake, the owner was aware that it was now time to get the brakes looked at.

The brake drum and hub are one piece on this Renault, and so once the drum is removed there is a very good access to the shoes. This make fitting the replacement shoes an easy task.

With the brake drum removed, the reason for the noise and the reluctance to release its hold when the parking brake was released, was soon observed. The brake lining on one of the brake shoes had broken away and was now causing problems.

The brake drum was in good condition and so all that was needed to bring this Renault back up to its full braking efficiency was a new set of brake shoes.

With the back plate dusted off and the wheel cylinders checked to ensure they were moving freely the new shoes were put into place before refitting the brake drum.



The brake lining on the old shoes had broken up – and with the brake drum and hub removed there is plenty of access to fit the new brake shoes into place.

FORD KA

Clattering clutch

Some problems give a few little warning signs, perhaps a slightly different feel or a slight noise. Others like the clutch fault that suddenly developed on this 2014 Ford Ka 1.3 diesel, gave no warning up to the point of the failure.

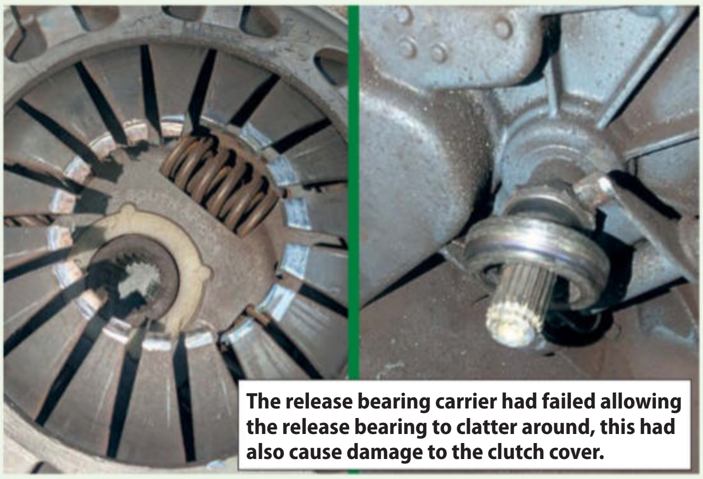
The owner described the situation as one minute they were driving along without a care in the world, then the next time the clutch was depressed it was accompanied by a horrendous clattering sound.

The motor may have made it to the workshop under its own steam, but the owner was not going to take the risk and called out the recovery service.

Around one hour later the Ka was sitting on the back of a low-loader and on its way to the workshop. On its arrival, the diagnosis was that the gearbox needed removing and I suspected a new clutch would resolve the issue.

One the gearbox had been removed, the fault could be seen – the clutch release bearing had broken away from the carrier – this had allowed the bearing to fly off centre and create the noise that the owner had heard.

There was no damage to the guide tube and so with a new clutch assembly complete with release bearing and bearing carrier, the Ka was back to its old smooth self.



The release bearing carrier had failed allowing the release bearing to clatter around, this had also cause damage to the clutch cover.

DACIA LOGAN

Coolant loss

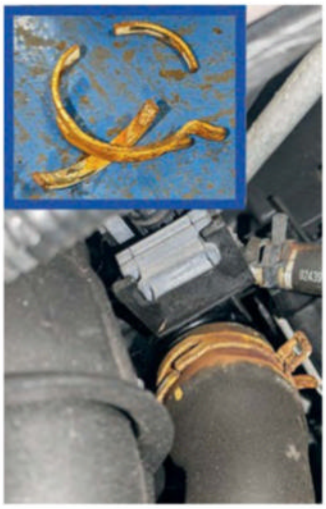
The owner of this 2020 Dacia Logan had only covered 10,000 miles since new and was now noticing a slight sweet smell from the front of the vehicle when parking up and decided to have a quick look under the bonnet. Seeing that the coolant header tank was low, the owner decided that the smell may be related to the coolant loss and drove along to see me.

The deduction was correct, and the smell was without doubt that sweet sickly smell that is given off by evaporating coolant.

The next step was to discover the source of the coolant loss. I decided to put the system under a pressure test. Before the pressure got too high, the coolant could be seen spraying out the end of the top hose.

The reason for the coolant leak could also be seen as being due to a broken spring clip fixing on the hose.

The remedy was simple, and the rusted and failed spring clip was removed and replaced with a sturdier worm-drive type. I also checked the other hose clips on the engine. The owner agreed that they would book the motor in later and have the coolant replenished and all the hose clips replaced.



The broken spring clip was no longer clamping the hose in place allowing the coolant loss, a new worm-drive type clip was fitted sealing the leak.

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Project Mazda MX-5 Mk3

Alloys, tyres & alignment

IN ASSOCIATION WITH BLUE PRINT

Part SIX: A freshen up of the original alloy wheels, new tyres and four-wheel alignment gives our MX-5 a new lease of life. **Martyn Knowles** reports.

I made a start on cutting back our MX-5 Stormy Blue paintwork, trying to remove as many scratches as possible. Every panel seems to have a scratch or five. Using a dual-action polisher to get deep into the lacquer, results are happening. However, I had to stop due to time limitation – and when I went to continue a few days later, we were now on a hosepipe ban in the area (and it's still in place two months on!). So exterior bodywork and glass polishing has stopped for the time being.

I moved my attention to the alloy wheels, which for a 100,000+ mile car weren't in that bad a condition. Each had minor kerb marks. But to make them extra special, I asked my local body shop to paint them in a colour of their choice to go with a blue exterior car.

Refurbishing alloys can be done in two ways – you will see in the next issue of *CM* 'Instant Expert' the alloy wheel refurbishers in action. Here, though, my body shop guys did this work by hand (with a DA sander to help). You won't get the alloys dipped in a cleaning solution or put on a machine to check if they are out of shape. The alloys have to be in a reasonable state for this operation to start. No filler is added to the alloys – they are rubbed down until the damaged area is removed.

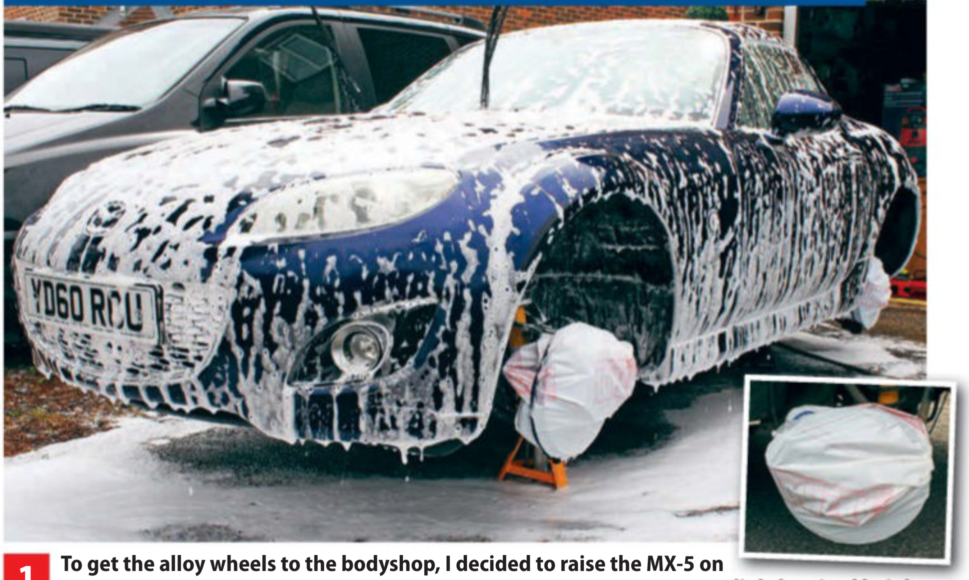
Kumho supplied new 17in tyres all-round, which are A-rated for wet grip. You may remember when I first drove the MX-5 back from the British Car Auctions car park, that full throttle action pushed the car towards the left kerb. Lifting off to change gear straightened up the bodyshell, before heading to the left again on full throttle in the next gear. Very strange feeling. I put it down to three things – tyres, bushes or dampers.

We had new Bilstein dampers fitted on all four corners earlier in the series. This didn't help. The rear bushes and droplinks looked OK and didn't have any movement in them. Now onto the tyres… to get the four alloys to the body shop, I lifted the MX-5 on my driveway onto axle stands. With the refreshed alloys still on the original tyres (the new Kumho tyres hadn't arrived), I decided to put the offside rear (the nearly worn but passed the MOT test tyre) onto the nearside front on refitting. Did it make a difference when planting the throttle to the floor? Yes it did. I now had more tramlining up front. Therefore, this 2018 Avon tyre was the culprit to our weird driving experience. Originally the tyres on the rear axle didn't match, the worn Avon was accompanied by a 2023 Churchill tyre on the nearside. Being rear-wheel-drive, it makes sense to have a matching pair on the back.

With Kumho 205/45 ZR17 rubbers now on each corner and four-wheel alignment adjusted, the MX-5 handles the road like a new car. It's not the fastest car off the line, but into corners and roundabouts it sticks to the road.

Next issue, we will see the underneath professionally rustproofed, while I continue up top trying to make the bodywork shine. Then a few small jobs before a final assessment of our project.

ALLOY WHEEL REFURBISHMENT



1 **To get the alloy wheels to the bodyshop, I decided to raise the MX-5 on four axle stands. This gave the opportunity to wash the bodywork at a slightly raised height and power wash the wheelarches. This was in July before the hosepipe ban came into force. I covered each brake disc with a plastic bag held on with a bungee cord to stop the washer hitting the brakes. The raised height was also good for treating the bodywork – polishing the sills and bottom door areas, using my dedicated valeters four-wheeled seat, made the job a little easier.**

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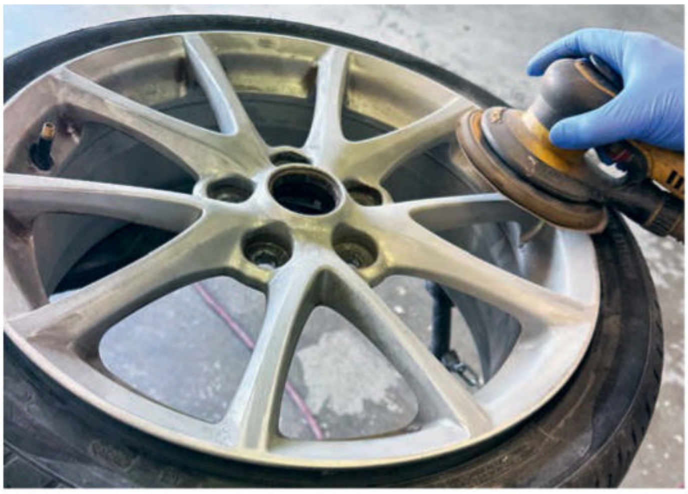
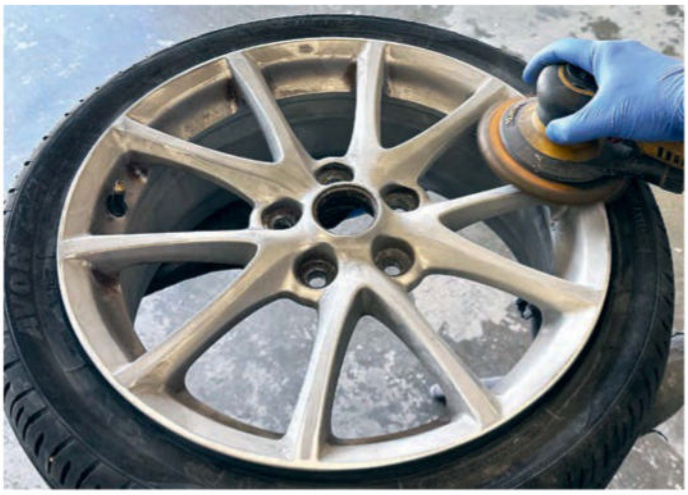
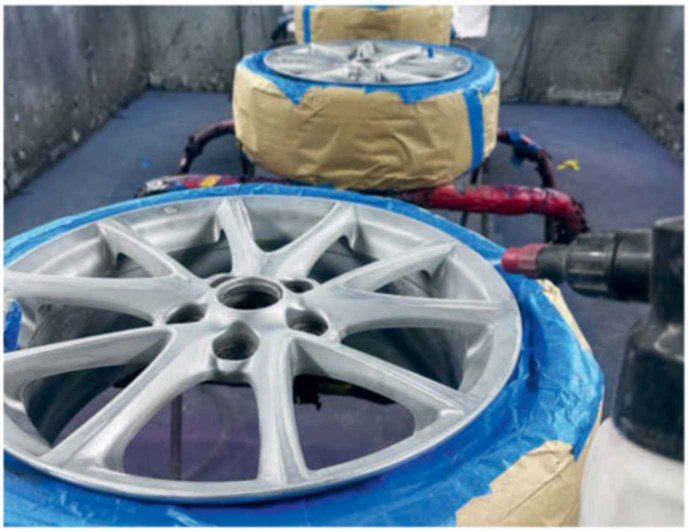


2 The four alloys went to my local bodyshop guys at Coastal Auto Body Ltd. They don't have a tyre removal machine, so each tyre is deflated. First, with the Mazda centre caps removed, a dual-action sander is employed to remove scuffing on the rim edge.



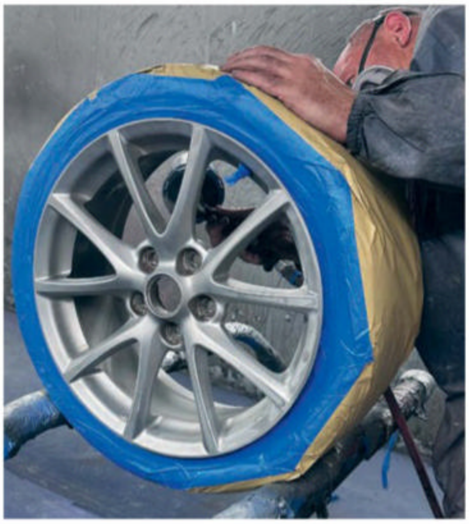
3 Finding the deepest cut in each alloy, the operator concentrates on this area first, buffing out the damage. Before moving onto the rest of the alloy edge, sanding it down to give a nice smooth finish around the circumference. The final sanding is done by hand.

4 The inner alloy surface is also sanded back. Each alloy takes around 20-30 minutes to get a satisfactory finish. Tyres are inflated again before a power wash to rid the area of dust and dirt. They are left to dry for a few hours before heading into the paint shop area.



5 The tyres are deflated again. Each tyre is then wrapped in protective masking paper, and finished with the blue masking tape to help keep everything in place. Plus each valve cap is carefully masked too. A degreaser is then sprayed on and wiped off before...

6 ...a tack cloth is wiped over each part of the alloy wheel to remove any trace of dust. Then a coat of non-sanding primer is applied to the entire wheel to provide a smooth base.



7 ◀ The body shop had chosen a silvery dark grey as the base coat. First it was applied to the alloy wheel inner area. As you can see, the alloy is held upright for this step – the deflated tyre helping it fit snugly on the panel stand. The operator is able to rotate the wheel as required to get to every part of the inner section.

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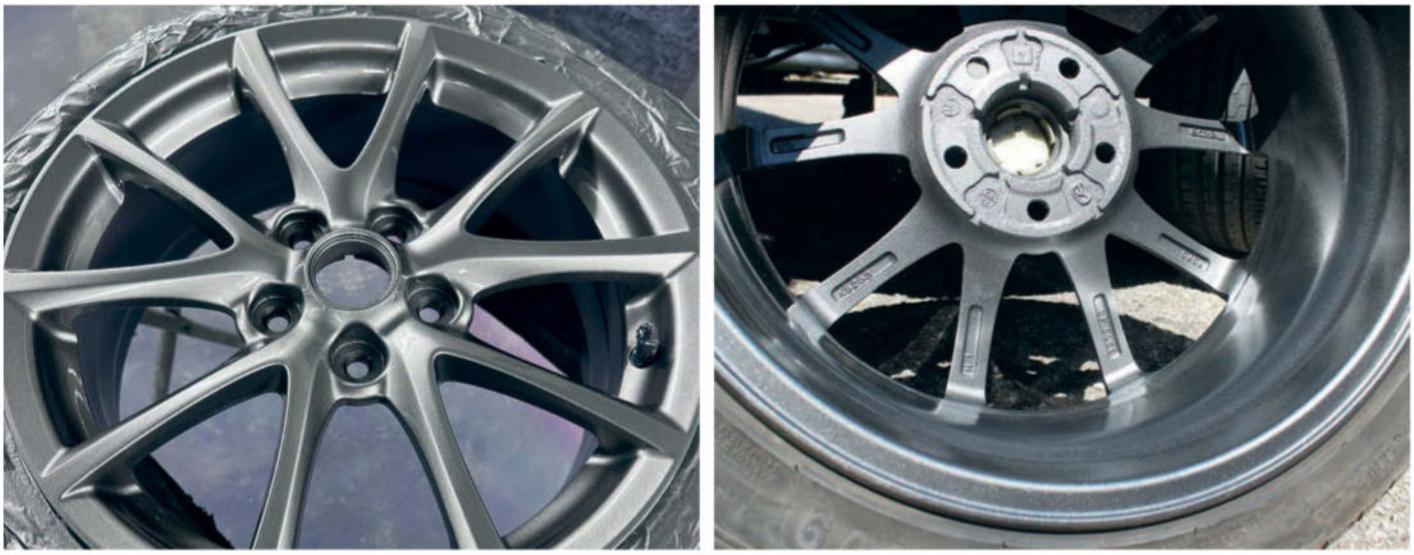
ALLOY WHEEL REFURBISHMENT CONTINUED

8 Now onto the front face of our alloys. The wheel and tyre is laid flat while the operator, using a smaller spray gun than what is used to paint an entire car, goes over the alloy in sweeping movements, painting each spoke before moving onto the next. The applied paint is left to dry in the heated spray booth for a 5-8 minutes, before a second coat is then applied.



9 With the base coat dry, the last part of the job is to apply two coats of clear lacquer. Once fully dried in the spray booth, each alloy wheel has its masking tape/paper removed. The tyres are inflated to 29psi. The new grey look is great I think. At £80 + VAT each alloy, the job isn't cheap. However, they give the car a new look and suit the blue paintwork. You can see an image of the alloys on the car in the next issue.

NEW TYRES

KUMHO
ECSTA

1 ◀ We ordered a set of Kumho Ecsta Sport tyres – size 205/45 ZR17 XL 88Y. They retail at around £90 each. I've recently bought a 2014 Vauxhall Mokka, and as you can see the new tyres fit in the boot very nicely. Just both rear seats moved back from their locked position to get the hatch to close for our travel to my nearest Setyres depot. I had to drop these off first before going back to fetch the MX-5.

2 The guys are Setyres start by removing the old tyres. Each tyre is deflated via the valve, before the tyre machine is used to remove the tyre from the rim, separating the bead from both sides of the alloy.

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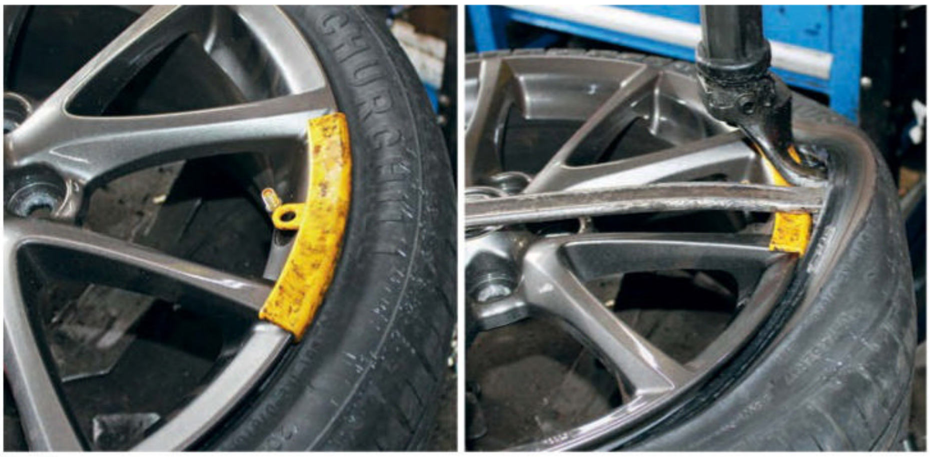
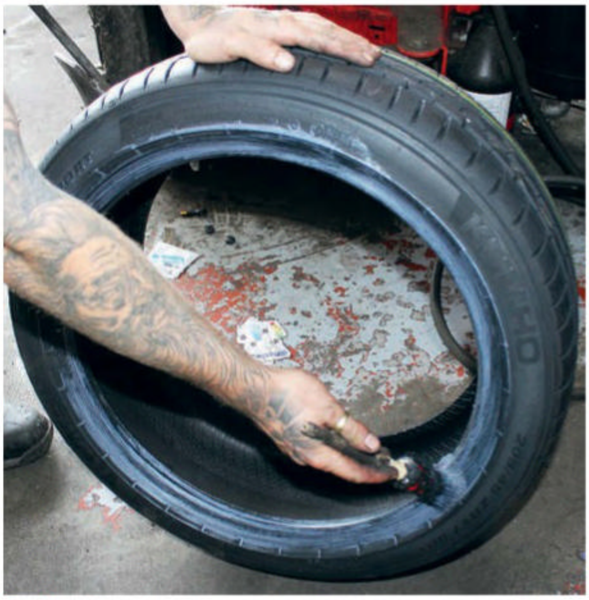
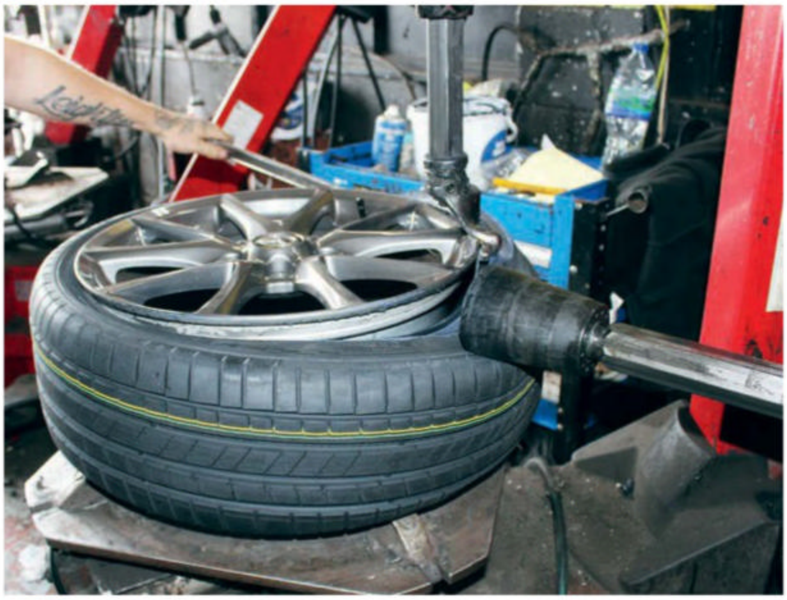


3 The tyre is moved to the top of the tyre machine to remove the tyre completely. Setyres protect our newly painted alloy with this yellow plastic placed near the valve. The machine locks over this and the operator uses a tyre lever in conjunction with the machine to rotate and lever the tyre off the rim. With the carcass removed, the rubber valve is then cut off and discarded.

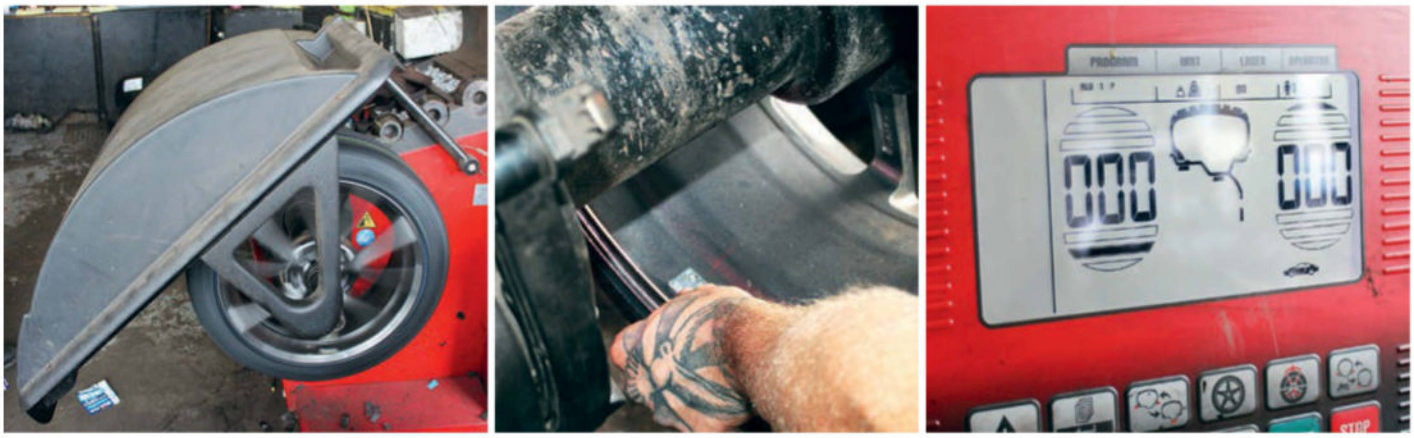
4 The worn Avon tyre had hardened sidewalls. In this instance, penetrating fluid is sprayed around the tyre edge to help the machine pull the tyre from the rim cleanly.



5 Our new Kumho tyres are now ready to fit. Black rimseal is painted on to the outer circumference of the new tyre and the inner part of the alloy wheel. This will help the tyre and rim bead together to create an air tight seal.



6 A new rubber valve and its centre core is fitted to the rim. With the new tyre placed over the alloy wheel, the operator uses the tyre lever and the machine to quickly seat the rubber in place. Once satisfied with the fit, air is added to the tyre. In our case, all four tyres require 29psi.



7 Wheel balancing is next. The wheel is mounted and locked onto the wheel balancing machine. The machine spins the wheel to check for any out of balance rotation. All our wheels required some degree of counterweights fitted to the inside of the rim to get them to bang-on zero.

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The MX5 Restorer (East Sussex) www.themx5restorer.co.uk

Vasstechnik vasstechnik.co.uk

NEW TYRES CONTINUED

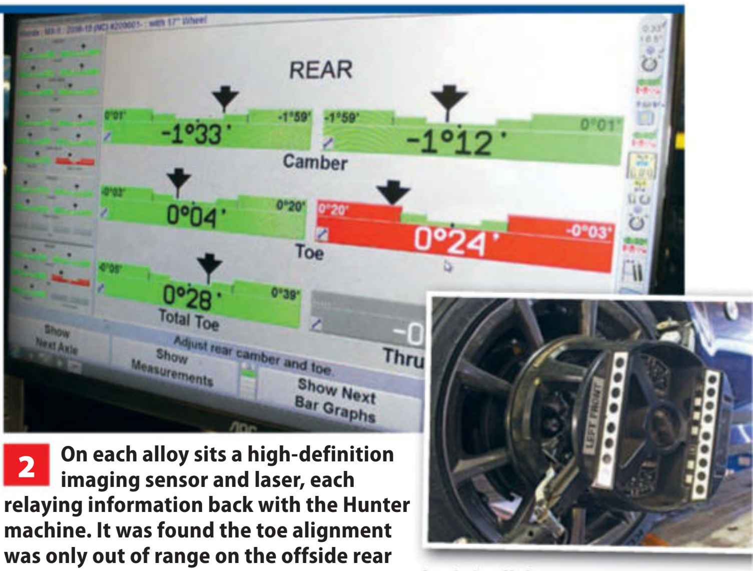
205/45 ZR17 88Y
KUMHO
ECSTA

8 We had a new locking wheel nut set from febi to fit. The Kumho tyres look great and feel good on the road. With an A-rated (A is top, E is bottom) wet grip test label attached to these Ecsta Sport tyres, my driving impressions using the rubber in wet weather will be written in the next issue.

FOUR-WHEEL ALIGNMENT

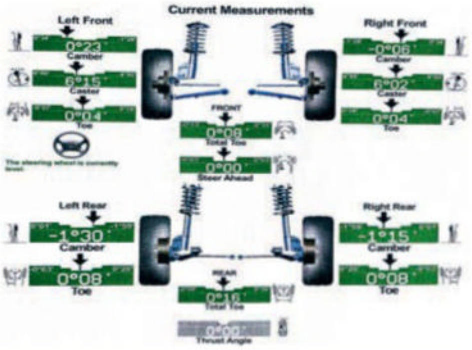
EASTBOURNE TYRE CO. LTD
British Goodrich
DUNLOP
YD60 ROU

1 I headed down to Eastbourne Tyre Company who are celebrating 100 years of trading this year – in the same location, still the same family-run business. Impressive stuff. Also impressive is the Hunter four-wheel alignment machine they have on the premises. A check of tyre pressures is done first, then measurements to wheelarch gaps is taken to make sure the car isn't lopsided.


REAR
-1°33'
-1°12'
Camber
0°04'
0°24'
Toe
0°28'
Total Toe
Show Next Axle
Show Measurements
Adjust rear camber and toe.
Show Next Bar Graphs
LEFT FRONT

2 On each alloy sits a high-definition imaging sensor and laser, each relaying information back with the Hunter machine. It was found the toe alignment was only out of range on the offside rear (the one that had the dodgy Avon tyre fitted originally).

1 ◀ The MX-5 has rear toe/camber adjustment available. In our case, just toe was adjusted using a 17mm spanner. The front track was also tweaked, however an induction heater was first used to heat the track rod nut as it was seized on the offside.


Current Measurements
Left Front
0°23'
Camber
6°15'
Caster
0°04'
Toe
Right Front
-0°06'
Camber
6°02'
Caster
0°04'
Toe
FRONT
0°08'
Total Toe
0°00'
Steer Ahead
Left Rear
-1°30'
Camber
0°08'
Toe
Right Rear
-1°15'
Camber
0°08'
Toe
REAR
0°16'
Total Toe
0°00'
Thrust Angle

2 ▶ With the settings completed, a test drive is undertaken. Our specialist operator had noticed a slight steering wheel alignment issue, so he reattached all the equipment for a final adjustment. Four-wheel alignment adjustment here is £99 inc. VAT.

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BMW 316i COMPACT RESTORATION

PART 2: **Andrew Everett** sorts out the rather challenged front end.

Last issue, I described how I acquired a 1998 316i Auto Compact and made a start on the restoration by sorting out the rear arches. This issue we're looking at replacing the front wings and grille panel. I thought I might be able to save the nearside front wing and whilst I did tidy it up with some skillfully applied P40 fibreglass paste and P38 filler, it'll only ever be a spare in case I need one in a hurry.

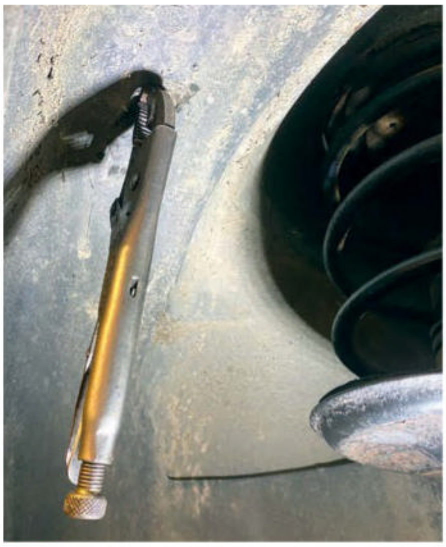
Needless to say, replacing the front wings wasn't quite plain sailing with a slightly major structural corrosion issue rearing its ugly head just as a shiny new wing was being bolted on. It's a common rot area and I really should have spotted it when I picked the thing up, but hey! In the end it turned out OK and it cost under a hundred quid to fix.

Let's crack on…

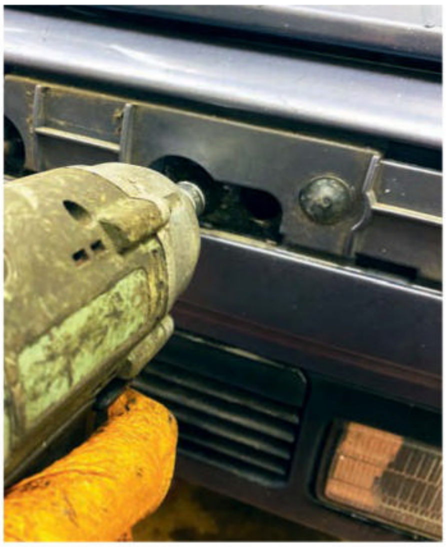
1 I had a pair of excellent wings in stock, and these were DA sanded to remove any bad paint, repair any minor rust or dings (none in this case) and primed. This is what the driver's side wing looked like after guide coating and rubbing down by hand with water and 800-grit wet and dry. It's ready for paint.

2 The passenger side wing needed more prep and it's a genuine BMW wing. Time taken now on preparation pays dividends – rubbing down and prepping in the door and bonnet shuts doesn't take long. You can see a lot of Boston Green paint here and both wings will be primed again.

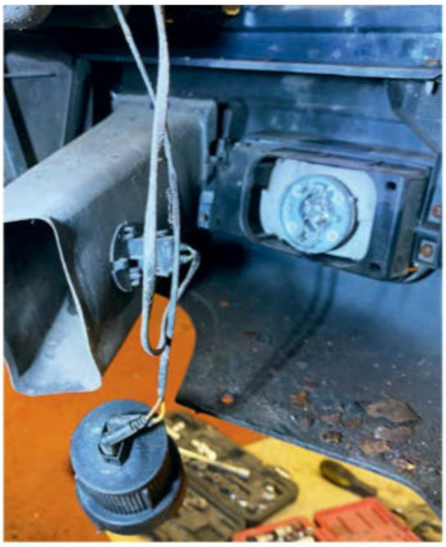
3 Here's the offside wing freshly painted Steel Blue and lacquered – I will give them both a very light flatting with 3000-grit and machine polish but the finish is already excellent. The colour was matched as close as possible from the scrap wing but it's not an easy job, especially after 27 years of fading.



4 To remove the front wings and grille panel, the front bumper must come off, as do the arch liners. These, and the bumper under trays, are secured by a myriad of very rusty 8mm self tapping bolts – order yourself a bag of about 30. Self-locking grips are often the only way to remove them.

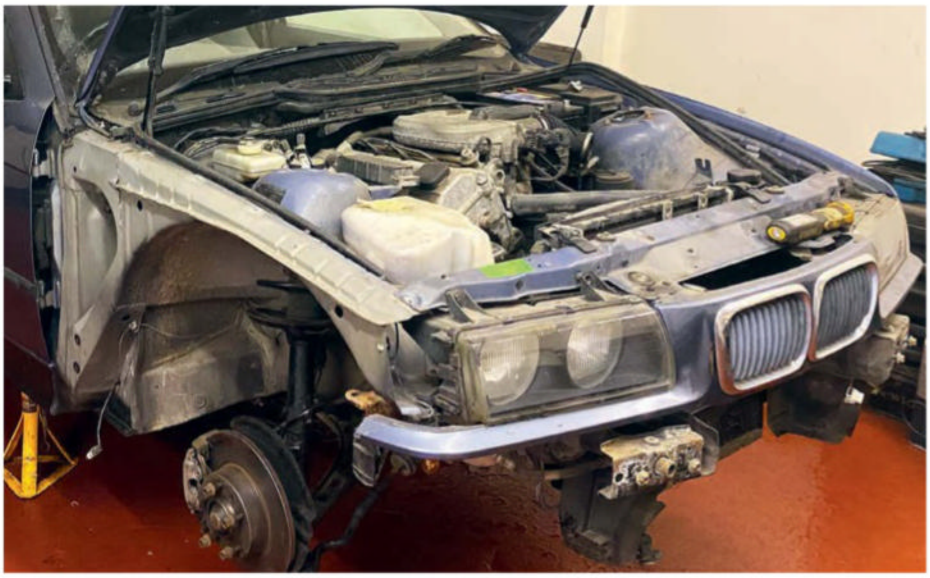


5 The front bumper slides off the plastic side runners after the black rubbing strips have been popped off and the four 13mm retaining nuts have been removed. The bumper mounting is very adjustable on the E36 so there's no excuse for the bumper fit not to be perfect.

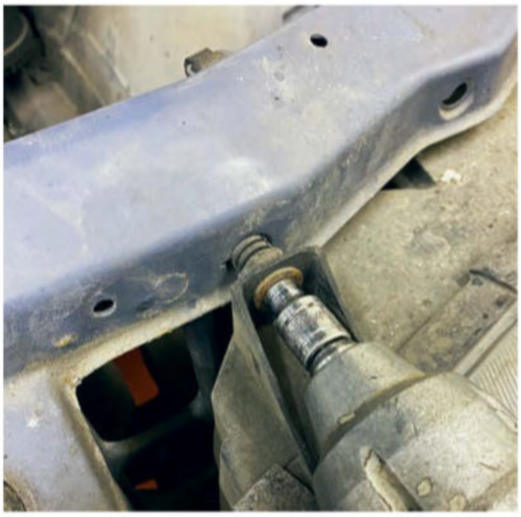


6 The bumper has a brake cooling duct each side as well as a foglight wiring plug – here, I've removed the rear foglight cap as I was replacing the foglight as well. These are clipped into the bumper and released by pushing a spring-loaded pawl on the top left of the mounting bracket.

7 The front indicators are removed by reaching down the back and pressing a retaining tang away from the headlight, after which it can be eased out of the slider rails on the side of the headlight. I'm replacing these clear indicators with a pair of the correct orange ones as I have a pair spare.

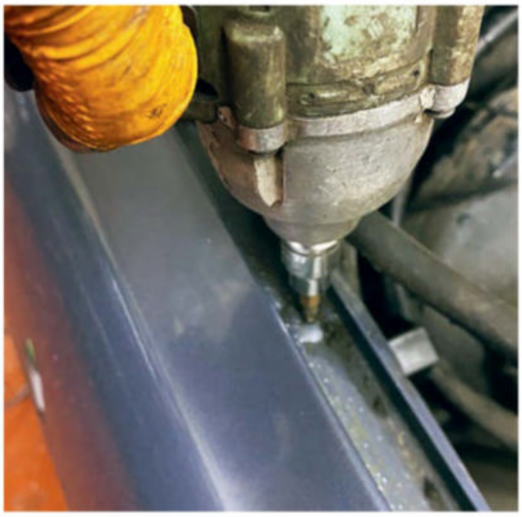


8 An E36 wing can be replaced without removing the headlight as shown here – one of the grille panel-to-wing bolts was so rusty I just took a cutting disc to it as you can see. You can also see the bumper sliders and the indicator rails on the side of the headlight.



9 ◀ E36 headlights are secured by four long 8mm bolts that screw into a plastic 17mm adjuster each. They retain headlight adjustment, hold the plastic adjuster with a spanner if needed and unscrew the 8mm bolt. Disconnect the connectors for the bulbs and headlight adjuster and lift out the headlight.

10 ▶ The wings are secured to the top of the inner wing with 10mm bolts on cars up to October 1991 and T25 Torx on later ones. These Torx bolts require a good fitting socket, and a 3/8 impact gun whizzes them out easily. If you round one out, a sharp screwdriver and a hammer will shock it free.



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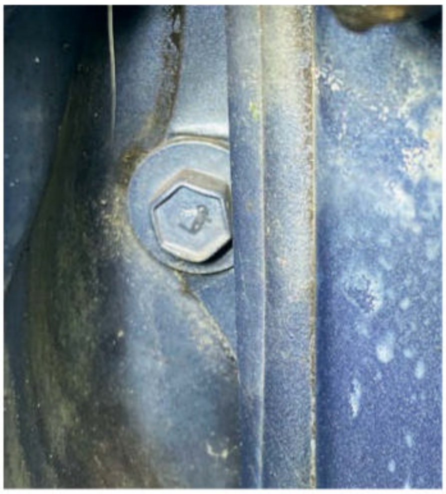
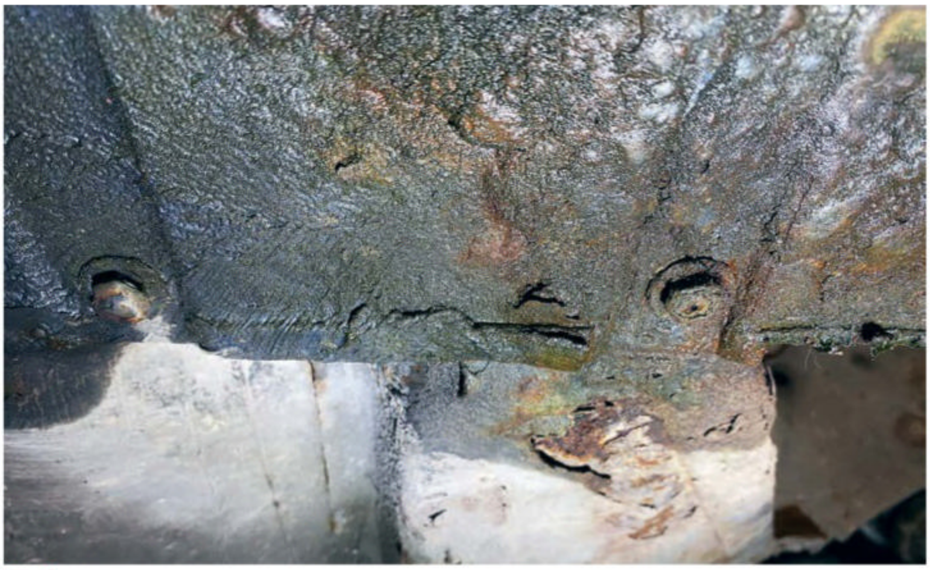
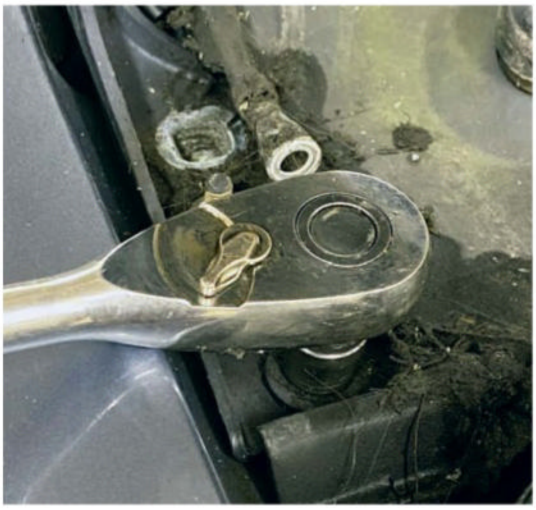


11 Two 10mm bolts secure the back of the front wing to the A-post and these are accessed with the door partially open. Like the bumper, the wing bolt holes on these E36 wings are big enough to allow quite a lot of adjustment – trial fit the new wings before they are painted.

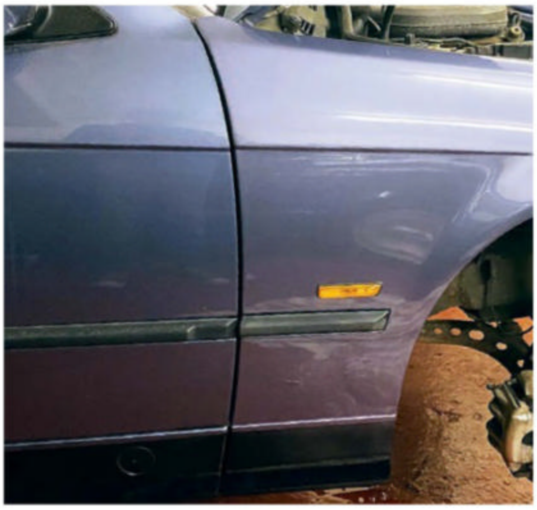


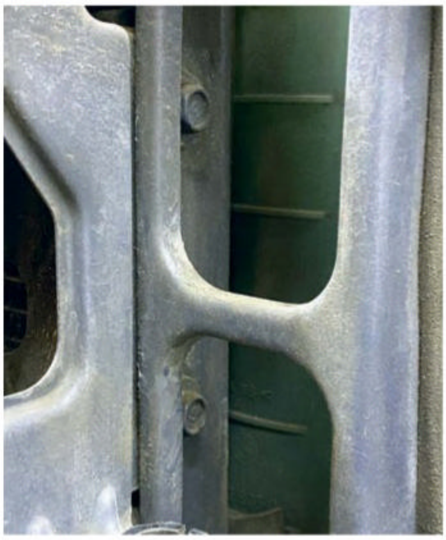
12 There are a couple of 8mm self-tapping bolts securing the wing to the inner wing and grille panel, so remove these before tackling the two 10mm bolts at the base of the wing. These are undersealed over on the production line, so you'll need to dig around the bolt heads before you can get a socket on.



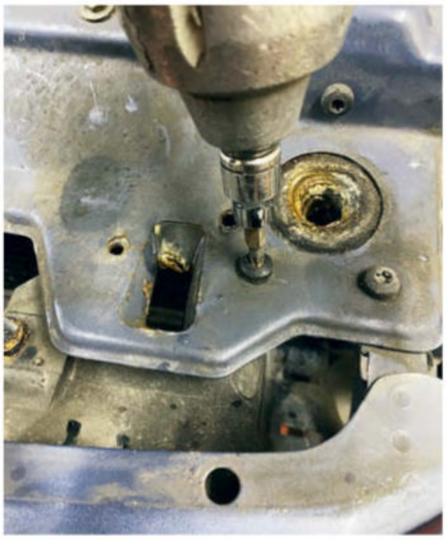
13 ◀ The wing is pretty loose on the car now – just the two 10mm bonnet hinge bolts. You should only replace one wing at a time to retain bonnet alignment, given the weight of the bonnet. Remove both 10mm bolts and pull the wing off the car. Refit the bonnet bolts temporarily.

14 ▶ An assistant is VERY useful to hold the bonnet whilst you slide the new wing into place. Loosely fit all the bolts including the two bonnet bolts and adjust the wing to be the best fit possible. This was my first attempt, and it sits about 2mm too high – it's worth persisting.

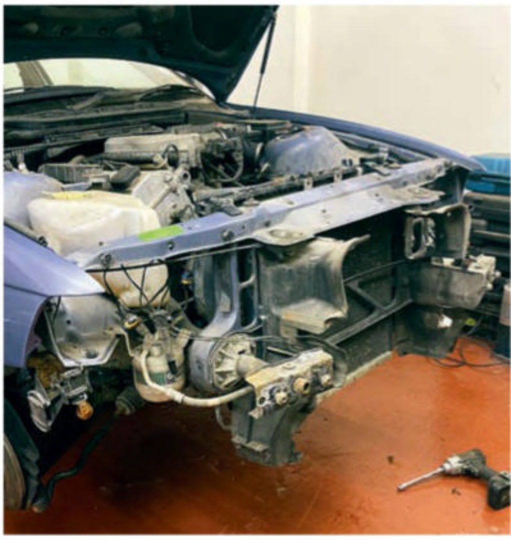




15 Start removing the grille panel by removing the two 10mm bolts that secure each side to the vertical front panel struts. On most cars they are accessed from within the headlight area, but I have seen cars with the bolts going in from the other side – I've no idea why that is.



16 Just the front two Torx screws on each bonnet catch need to be removed and the grille panel will slide out. Remove the other Torx and the bonnet catch will come out if needed – I stripped and cleaned mine but a new pair is under £50. Those, and a new centre cable, are worth fitting at this stage.

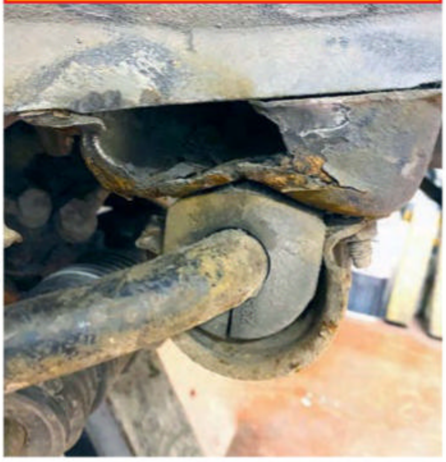


17 Here it is with the grille panel removed. On this four-cylinder car the air-conditioning fan is in the engine bay – on six-cylinder cars it's in front of the radiator. You can see the air-conditioning dryer bottle below where the offside headlight fits. I also spotted something pretty awful.

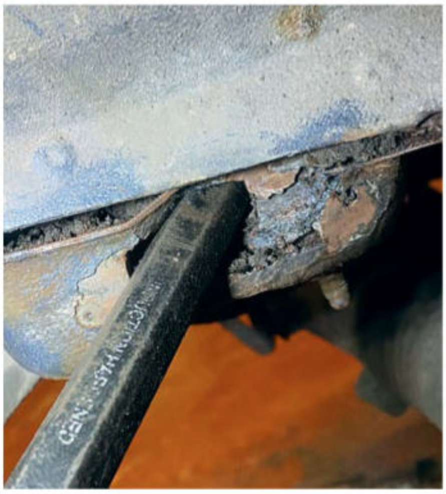
NEXT MONTH

We fix the door trim and address various mechanical things before an MOT test.

18 More on that shortly, but here it is built up minus the plastic wheelarch liners and the bumper rubbing strips – the bumper is just resting on there temporarily for this picture. I took the time to readjust the front wing fit the following day (after this picture was taken) as it was annoying me. It has to be right.



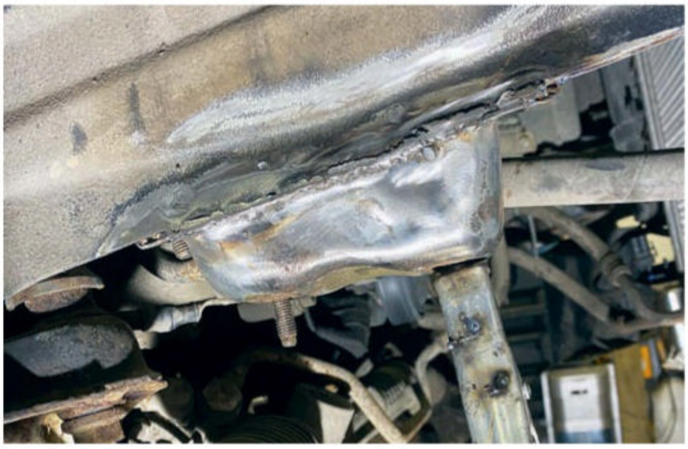
19 Now this is annoying. Despite being a fairly common rot area, I only noticed this when fitting the offside wing – it's the front anti-roll bar mounting and it's literally falling apart with the anti-roll bar making a bid for freedom. I can't weld so this is something of a blow.



20 The other side looked alright but it failed the sharp chisel test. Bugger. The reason these are rotten is because the side seam is open, and muddy rainwater gets in and the mounting fills with mud. Most BMW E36's are sealed here but some, including this one, were not.

21 With the aid of a spot weld drill, a chisel and a grinder, the rotten mounts were off in an hour. New ones are £180 the pair from BMW – no thanks. I got a good used pair from a BMW breakers for £60 complete with a bit of chassis rail. A bit more work but every pound is a prisoner now.

22 The used mounts were drilled off the bits of chassis legs, and because they were fully sealed, are in perfect condition. Pre-October 1991 cars (so all H- and early J-plate cars) have different mounts welded in a different place, not that there are many BMW E36's that old still around.



23 A mate with a MIG welder kindly came over and spent a couple of hours welding the new mounts to the chassis rail. These were plug welded as well as runs of seam weld around the edges – we ran a solid weld all the way along this seam as seen here.

24 These were primed, painted Steel Blue and given a bit of Waxoyl from a rattle can. It's very thick steel so they won't rust out again. With a sigh of relief, the anti-roll bar was bolted back on and the front-end reassembled, with the arch edges and wing insides Waxoyled as well. A disaster averted and a favour owed.

Product Test

Rob Hawkins puts products through their paces

Which WIRE BRUSH?

With many different sizes and types of wire brushes, is there one that's suitable for the majority of jobs? Rob finds out.

An online search through the product pages of Draper, Laser, Machine Mart and Sealey for a wire brush reveals numerous products, many of which seem to be something you can't do without. Consequently, you can easily fill a drawer of a tool cabinet with one of every type, but do you really need so many different ones? Perhaps the traditional wooden handle with steel bristles is all you need?

We've been using and testing a wide variety of wire brushes over the last six months in an attempt to find out which ones are the most versatile and reliable. We've used them when servicing brakes, refurbishing steel wheels and preparing the underside of a Ford Fiesta and Ford Ka prior to rustproofing it. Throughout this time, we've discovered how long some wire brushes can last, whether steel bristles are better than brass and how ergonomic some of them are.

We've also asked several students at Harrogate College to use a selection of wire brushes to help discover the best and worst tools. At times, we were surprised by the preferences and opinions of students and experienced mechanics, who favoured different types of wire brush. We also made our own discoveries, often by accident, so the following pages reveal our findings and conclusions.

CONTACTS

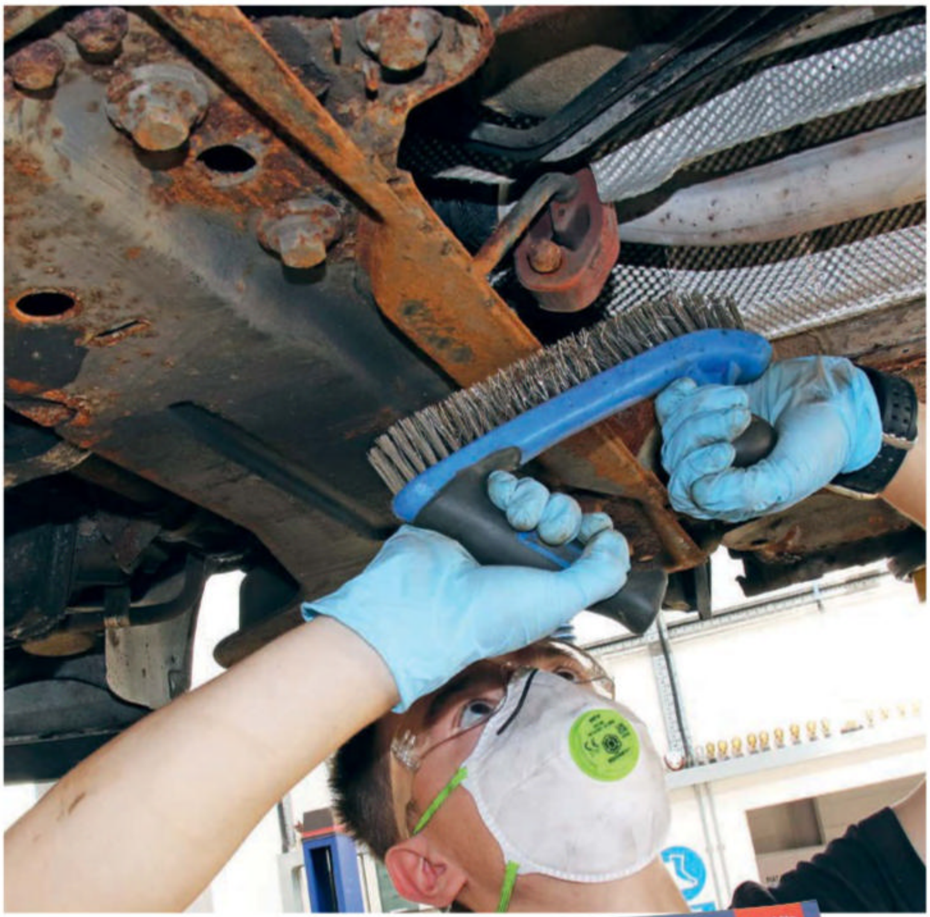
Draper 023 8049 4333 www.drapertools.com

Harrogate College
https://harrogate-college.ac.uk

Laser 01926 815000 www.lasertools.co.uk

Machine Mart 0115 956 5555
www.machinemart.co.uk

Sealey 01284 757500 www.sealey.co.uk



Brass, stainless steel or nylon

▶ The bristles on most wire brushes are made of brass, stainless steel or nylon. Whilst stainless steel is the toughest and ideal for removing rust, brass is a little softer, so can be useful for cleaning where you don't want any scratches. Nylon is best suited to delicate jobs, such as cleaning carbon deposits from a spark plug.

These guidelines won't necessarily help to preserve a wire brush; that's down to its size and how aggressively you use it, but it can help to ensure you have the right brush for the job.

Model No.
AK9791
SEALEY
2PC MINIATURE
BRUSH SET
www.sealey.co.uk

Worn bristles

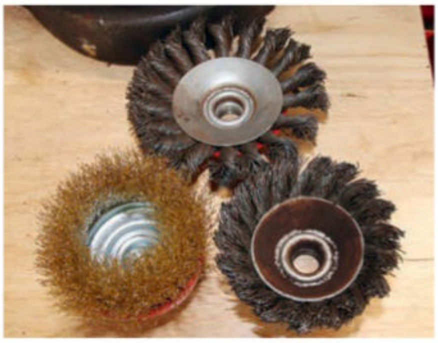
▶ It may be hard to throw away your old brushes, but when the bristles start to fall out, or are splayed out at all angles, then their effectiveness at scrubbing is vastly reduced. A steel wire brush that's past its best will take longer to clean a surface, whereas a softer brass or nylon brush will be as much use as a soft cloth. Telling whether a brush is past its best can often only be checked when you have a new one to compare it with.

We recently discovered this when cleaning a steel road wheel with an angle grinder and a couple of wire brush attachments. We wondered why we couldn't remove the rust and paint on the inside of the wheel with our old wire brush attachments, but after buying a new wire brush, it stripped everything back to bare metal. However, the new budget-priced brush only lasted for one road wheel.

If you are using an electric drill with one or more brush attachments, try switching it to reverse (counterclockwise) to see if the brush is more effective. The bristles may have become bent through use and won't be as good for cleaning. The same applies to wire brushes for angle grinders, although most angle grinders only operate in one direction (clockwise).

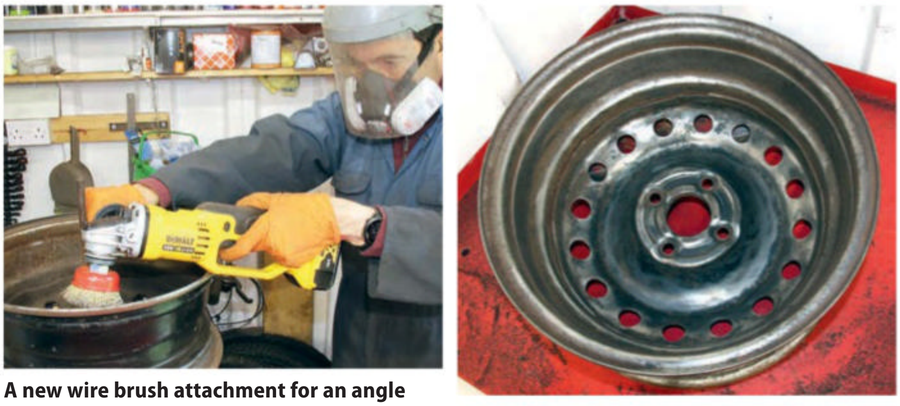
Bent and missing bristles on this handheld wire brush show how ineffective it is against the rim of a road wheel.

Flattened bristles make contact with the surface of this road wheel, but they're better at polishing the surface instead of scrubbing it.



Bent bristles on the two wire brushes on the right mean they won't clean effectively when used on an angle grinder where the spindle rotates clockwise.

Switching this drill to rotate counterclockwise helped to get a little more use out of this worn wire brush attachment.



A new wire brush attachment for an angle grinder helped to quickly strip the inside of a steel road wheel to bare metal. But, after cleaning one wheel, it was worn and wasn't as effective on the next one.

Angle grinder tools

▶ Wire cups, brushes and wheels that can be attached to an angle grinder are very effective at removing corrosion. Most are suitable for an angle grinder with an M14 spindle and are fitted without the disc guard. Flats around the thread of the hole (on the wire cup, brush or wheel) enable it to be tightened with a suitable spanner (usually 22mm).

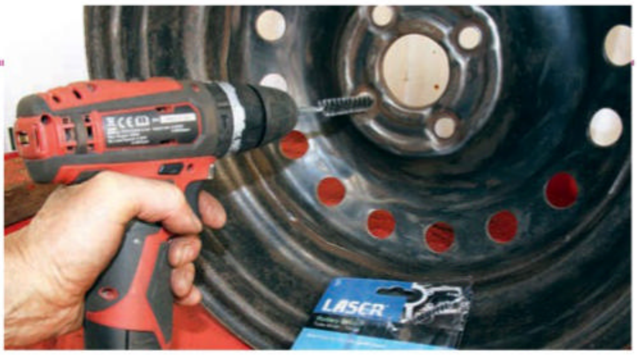
This type of tool is the most aggressive, so we recommend wearing a visor (also called a face shield) instead of safety goggles because the fragments that can get flung off are painful if they hit your face. Thick gloves and overalls should also be worn, and ear defenders and a breathing mask will protect your hearing and lungs.

Prices are very competitive for these tools – expect to pay around £5 for individual ones, but only £10 or more for a set.

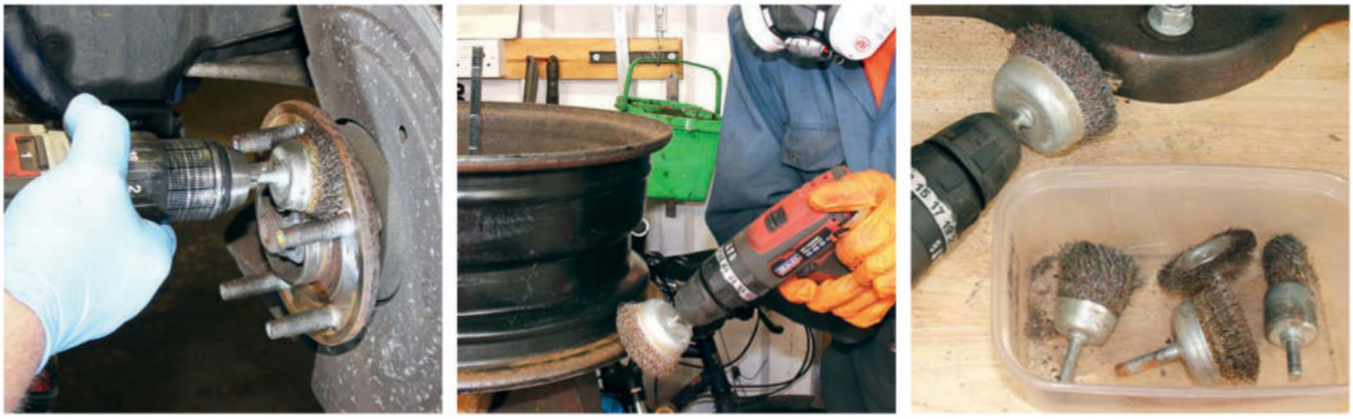
Drill attachments

▶ A range of brushes and wheels that can be fitted to an electric drill can prove useful for rust removal and similar cleaning jobs where an angle grinder is too large and aggressive, and a handheld wire brush is too slow. These can be more effective for cleaning around a wheel hub (where a road wheel or brake disc is fitted), or inside the rim of a road wheel (where the tyre seals against it).

A set of these tools costs from around £10 and includes a 6mm-wide hexagonal-shaped end to slot straight into the chuck of a drill. We have also found some useful designs of brushes that can be attached to a drill. Laser Tools, for instance, sells a tube brush (also called a rotary brush – part number 3150) that looks like a small bottle brush, which is ideal for cleaning inside holes.



Laser's tube brush is useful for cleaning inside holes, such as this road wheel, where corrosion forms inside the holes for the mounting studs.

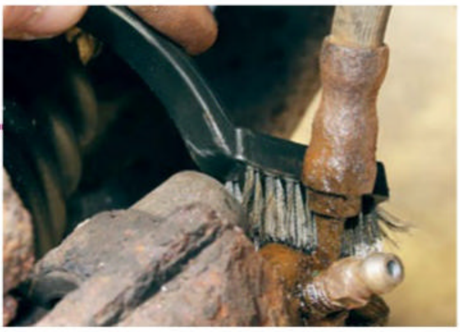


Wire brushes that can be attached to a handheld drill are cheap to buy and useful for small jobs, such as cleaning a wheel hub's mating surface or inside the rim of a wheel. Expect to pay upwards of £10 for a set of wire wheels, brushes and cup brushes.

Spid brush

▶ Also known as a scratch brush and features a plastic handle with a metal body and bristles made of stainless steel, brass or nylon. This type of brush has densely packed bristles with an angled end. According to **sitbrush.com**, it was designed and patented by Societa Italiano Tecnospazzole (SIT) over 55 years ago. Whilst it's popular for welding, it's also useful for removing rust, paint and brake dust. And it's cheap to buy at around a fiver or more.

Mini brushes



▶ Small wire brushes that are roughly the same size as a toothbrush are readily available and often very cheap at around £3 to £4 for a set of three (steel, brass and nylon). Whilst they are ideal for working inside confined spaces or across small surfaces, such as the edges of a brake pad, they can quickly become overused and worn (the bristles will become bent outwards). Having at least one medium-sized brush (see our separate information on this) will help to preserve those smaller ones.

Medium brushes

DRAPER
Wire Brush Set

▶ We reckon a medium-sized wire brush can cater for the majority of jobs. They may cost a little more than the miniature brushes, but they should last longer (although often not as long as the larger brushes). However, we have managed to flatten and break the bristles on two of these types.

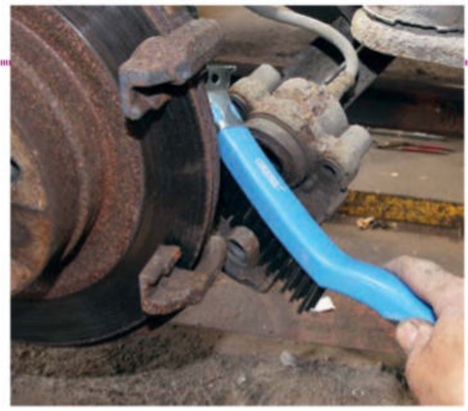
During our testing, we often found that we initially expected a miniature brush to be suitable for a particular job, such as cleaning around a fastening before attempting to undo it, but were surprised to discover a medium-sized brush could be used instead.

We particularly like these types of wire brushes if they have compact bristles, which seem to be effective for cleaning components.

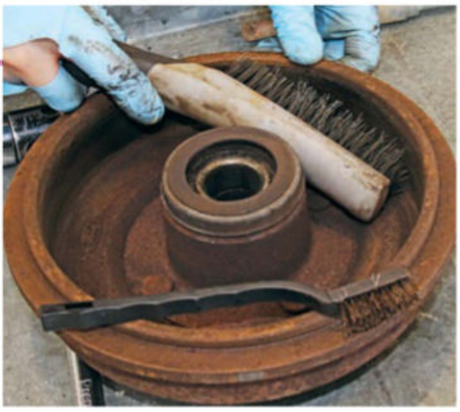
Big brushes

▶ Is big better? There's no denying a strong set of steel bristles attached to a large brush should make short work of removing corrosion and dirt from a brake caliper and its carrier, but it may miss any hard-to-reach areas, so a medium-sized or miniature wire brush may still be required. The cheapest of these large wire brushes is often the type with a wooden handle and spaced-out bristles. The bristles at the very front often wear first and either break or bend, but the tool can be given a second lease of life by simply sawing off the end of it!

Ergonomic handles have made these large wire brushes more effective to use. An angled handle helps to scrub inside a brake drum, for example. More leverage can be applied if the handle resembles a woodworking plane, with two grips to hold (see the next page).



At 35cm long, this wire brush from Draper (part number 17179, costs around £6) includes a scraper, so it's very big, but its steel bristles were useful for removing rust and road dirt from this brake caliper.



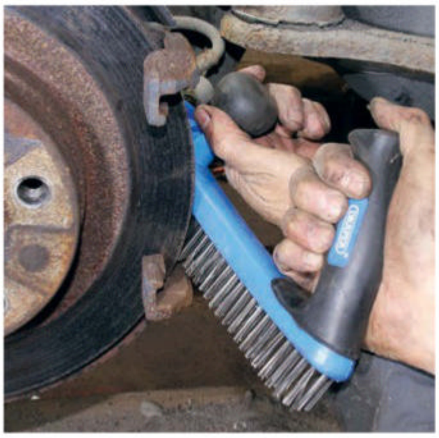
For around £4, we found this steel wire brush from Sealey (part number WB102) was the right size to work around the inside of a brake drum, despite we initially thought we would need to use a miniature wire brush.

⇨

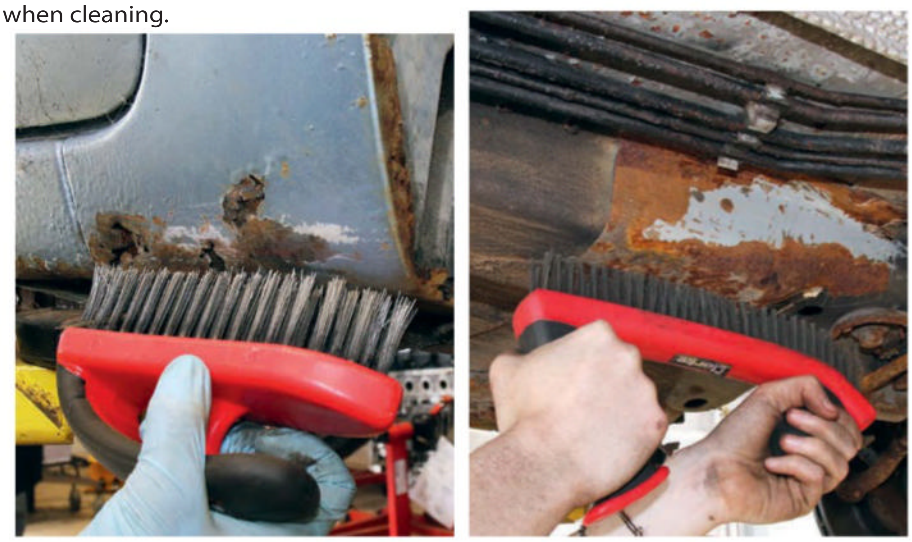
Better grip

▶ Most wire brushes have a handle, which helps to keep your hand away from the bristles. However, some wire brushes have a different design of handle, which helps to make the overall tool more compact and, in some cases, easier to hold or better to grip. We've used wire brushes that have a looped or wrap-around handle, which offer a better level of grip and protection for your knuckles. This type of tool is useful for cleaning along the edge of a sill, for example. There are also smaller alternatives, which look like a nailbrush with a similar style of handle.

Our favourite type of wire brush in this category is one with two handles in a similar style to a woodworking plane. This design makes it easier to apply pressure when cleaning.



This large wire brush from Draper Tools (part number 17188) is styled around a woodworking plane, so it can be gripped with two hands to improve the scrubbing of a component. Expect to pay around £11.

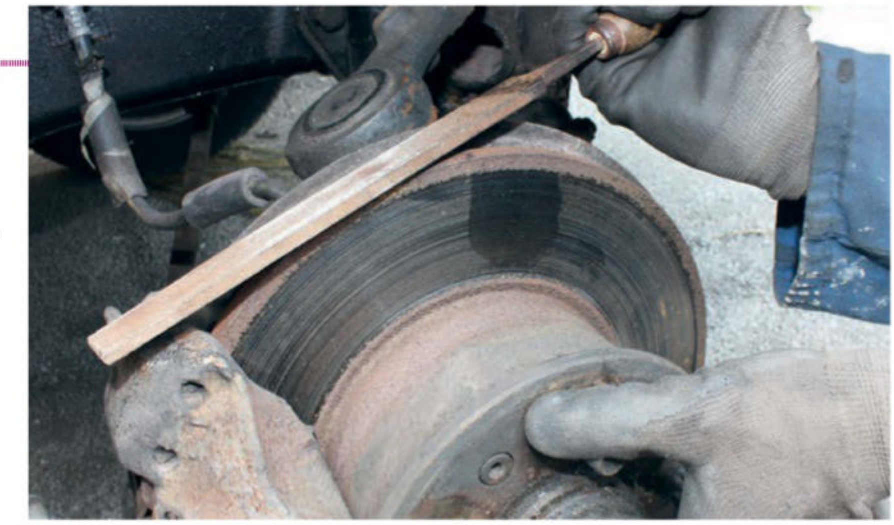


Available from Machine Mart for £11.39 (product code 040212767), these two wire brushes have useful handles to help grip the tool and apply pressure.

Alternatives

▶ A wire brush isn't always the best solution for cleaning a component. Take a brake caliper's stainless steel slider pins, which often need to be cleaned to remove surface dirt and light corrosion. A wire brush with compact brass or nylon bristles may help, but a strip or piece of abrasive paper can often be easier and more effective.

Similarly, when it comes to cleaning a brake caliper carrier, the flat surfaces where the edges of the brake pads make contact can be best cleaned with a flat file, although a wire brush will be more effective at removing any rust or dirt on the rest of the body.



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Buying & Owning

Ian Cushway searches out **new** and **used** parts prices

Peugeot 308 GTi

This overlooked family-friendly hot-hatch punches way above its weight in the performance stakes. It's now great value, too!

Peugeot has form when it comes to hot hatches. The hoodlum 205 GTi is now a 1990s performance icon and even the 306 GTi-6, despite its many foibles, has a strong band of loyal followers. More recently, the 208 GTi received a significant nod of approval, too, so when the firm revealed the GTi version of its family-oriented five-door 308 in 2015, it inevitably pricked the interest of those in search of the practicality/performance sweet spot.

Visually, you'd be hard pushed to distinguish it from the rest of the 308 range; there's nothing in the way of tailgate spoilers, wild flared arches or extravagant sideskirts. Indeed, 'understated' is the name of the game throughout, and while its subtle looks might disappoint the testosterone-fuelled boy racer fraternity, it suits the more sophisticated family car market very well.

It must be said though, the car's real talent lies with what's under the bonnet – namely a fearsomely quick 1.6 turbo generating 250 or 270bhp, depending on which model you choose (the 250 or 270). And because it tips the scales at just 1200kg, it's well deserving of that GTi badge on its boot. Talking of which, swallowing a generous 470-litres, luggage space easily outshines its major hot-hatch rivals which, despite there not being a huge amount of rear legroom, is another reason it's likely to appeal to family car buyers.

In 2017 there was a mild facelift when the front end was treated to a refresh with a larger grille and reprofiled headlights, Audi-like scrolling indicators, smoked rear lenses and a much-improved Apple CarPlay touchscreen display. At around this time, the 250 was removed from the range and from late 2018 the 270 was renamed the 260 to comply with new fuel economy and emissions standards though in reality the car's performance was largely unaffected. The model was eventually replaced by the third generation 308 in 2021, the 222bhp GT being its spiritual successor.

Finally, a quick word about parts. Peugeot main dealers offer a range of approved 'aftermarket' parts for vehicles over three years old and where available we've listed these as well in our parts price comparisons. Don't you love it when manufacturers are this owner friendly!

Engine

PSA's high-power 1.6 THP engine features Mahle forged alloy pistons with oil jet cooling, strengthened conrods and reinforced retaining bolts, a single scroll turbo and a tuned exhaust manifold. It was used previously in the Peugeot RCZ-R and is pretty bulletproof.

Being a petrol, obviously there's none of the DPF issues that have dogged diesel members of the 308 family. As always, though, reliability – and timing chain/tensioner health – depends on regular oil and filter changes; the recommended interval is every year/15,000km or 9000 miles.

The only reported issue we got to hear about was a slight engine hesitation, possibly due to an iffy coil pack or passed-their-sell-by date spark plugs; officially, the plugs should be replaced every 12,500 miles as part of the regular service regime. If the stutters persist, faulty non-return valves in the fuel tank or a failed high-pressure fuel pump could be to blame.

Steering and suspension

The sporty 308 sits much lower than the stock 308, so roadholding is excellent. The spring settings are stiffer too, so its firm but without being harsh or uncomfortable. In fact, Peugeot got it pretty much spot on with this car.

That said, the steering has come under criticism for lack of feedback; owners say it's too light at motorway speeds and too sensitive at other times. And we can't talk about the steering without mentioning the steering wheel itself; Peugeot adopted the controversial 'i-cockpit' arrangement, so it's small like a go-kart's, and obscures the dials in its 'normal' position. The option is to lower it, so you look over it rather than through it. It's a Marmite thing among owners.

Brakes

The GTi's brakes haul the 308 up with confidence, though the stoppers on the 270 have extra bite with its Alcon setup which features four-piston calipers and 380mm floating front discs. The only downside is that you'll pay a premium for components as the Alcon discs are only available through main dealers. Indeed, we've read that some 270 owners swap them for the cheaper to maintain 250 setup for this very reason.

Which model?

▶ You won't be disappointed with spec; Peugeot threw in the kitchen sink in this respect with dual zone climate control, cruise, auto headlights and wipers and even a reversing camera appearing as standard. Believe it or not, massaging front seats were offered as an option, too.

When new, there was a £1600 premium to pay for the 270 and for this owners got more horses, a Torsen helical limited-slip differential and seriously better brakes. Therefore, bang for your buck, the 270 trumps the 250. However, you have to seriously consider the significantly higher price of brake components. Indeed, it possibly explains why the 270 outnumbers the 250 in the classifieds.

There was a two-tone paint scheme offered which, like the steering wheel, is a Marmite thing; if you like it, great – but you might find two-tone cars more difficult to sell on.

Cars with the fixed panoramic roof were flooded with extra light inside but the electric sunblind can easily snag so watch for this. The only other option worth seeking out is the Denon audio upgrade which sounds terrific.

Steering/suspension component prices

FRONT COIL SPRING (EACH)
Main dealer £272.98
Independent from £97.29

Engine component prices

OIL FILTER
Main dealer £17.29,
Approved Aftermarket £8.65
Independent from £6.39

HIGH-PRESSURE FUEL PUMP
Main dealer £494.47

COIL PACK (EACH)
Main dealer £470.64
Independent from £25.29

Running costs

▶ Even the 270 308 GTi returns over 40mpg on a run so these cars won't cost much to fuel. That said, some of the body panels are unique to the GTi, which explains why the 250 and 270 are Group 34 to insure. The newer 260 comes in at Group 36. Annual VED is £195.

However, Pug1off offer a handy solution. They list a two-piece Godspeed disc and bell alternative (£687.50) so the bells can be re-used and just the outer rotors replaced when worn (£495.83) which will help keep costs down.

They also supply a caliper rebuild kit (£249) for the Alcon calipers.

Brake component prices

FRONT BRAKE DISCS (PAIR)

Main dealer £1274.33, independent from £1025 (Tarox, from Pug1off) ***for the 270***

Main dealer £316.10, 'Aftermarket' £172.42, Independent from £142.88 ***for the 250***

FRONT BRAKE PADS

Main dealer £378.71, 'Aftermarket' £52.49, Iindependent from £279.66 ***for the 270***

Main dealer £192.24, 'aftermarket' £42.22, independent from £53.20 ***for the 250***

Other issues

The 308 GTi's exemplary grip depends on having the right rubber, so it would be a mistake to skimp on tyres. Goodyear Eagle F1s are liked, as are the original fit Michelin Pilot Super Sports. Both will be dearer than some of the budget options, but it will be money well spent.

Otherwise, watch for any electrical glitches – we're talking about infotainment screens that don't work and niggles with the keyless-entry system. Oh, and aircon compressors can stop working, which seems to be another weak spot.

Other component prices

AIRCON COMPRESSOR

Main dealer £1249.80, Aftermarket £726.95

The 308 GTi cabin is a nice place to be – and there's an extensive standard equipment list.

The more track oriented 270 model is distinguishable by its 19in Carbone alloys.

What to pay

▶ Heavy dealer discounting from new meant the 308 GTi suffered harsh early depreciation, which instantly made it a bargain on the used market. It's a rare model though, so you might have to travel to view one.

Realistically, £7000-£8000 will get you a nice example, though we've seen early high milers being advertised privately for £5995. With £10,000-plus to spend, you'll get a newer 270 model with 60k miles.

Incidentally, while vehicle descriptions rarely state whether the car is a 250 or 270, the bigger 19in 'Carbone' wheels as fitted to the latter provide a handy clue. Either way, clarify what model you are looking at before you leave home!

USEFUL CONTACTS

Euro Car Parts 020 8956 5000
www.eurocarparts.com

Bilstein www.bilstein.com

Pug1off 01208 701919
peugeot-tuning-parts.co.uk

Rtec Shop 01727 790 100
www.rtecshop.co.uk

Verdict

▶ The 308 GTi, or the '308 GTi by Peugeot Sport' to give it its proper name, flies under the radar of most hot-hatch buyers. And that's why we like it. Sure, it might not offer the same visual drama as its breathed-on hatch rivals but for the most part – this should be seen as a positive. In a nutshell, it's quick, well screwed together, reliable, has a family-sized boot and is now very good value for money. The only real niggles are the lack of rear legroom (although it's no worse than other cars in its class), that opinion-splitting steering wheel position and the fact the touchscreen display is a fiddle to use.

308 GTI 2015-2021

Model	250	270	260
Engine (cc)	1598	1598	1598
Power (bhp)	246	268	258
0-60mph (secs)	6.0	5.8	5.8
Top speed (mph)	155	155	155
Average fuel (mpg)	47	47	37.8

Peugeot's 'Marmite' i-cockpit features a miniature steering wheel that you look over rather than through. Owners either love it or hate it.

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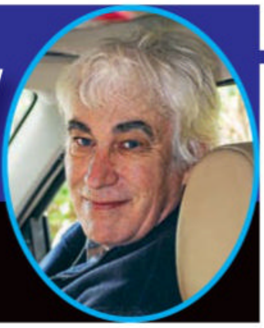
Dealer's Diary



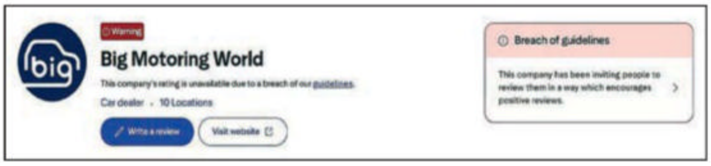
Peter Simpson provides us with an insight into the automotive sales trading world – and beyond.

Has BIG been BAD?

Big Motoring World has become the first car dealership to be suspended from review platform Trustpilot for, allegedly, offering monetary incentives to influence customer reviews.

At the time of writing, the Trustpilot listing says that an overall rating is "unavailable due to a breach of our guidelines", though individual ratings are still visible. Big Motoring World, however, deny that they have done anything wrong, and have suggested that the issue may have resulted from a "misunderstanding." They went on to say that, "Under the current management team, Big Motoring World has seen a marked and sustained improvement in customer satisfaction scores, and we refute wholeheartedly any suggestion that customers are paid to remove or hide negative reviews, or that others are incentivised to leave positive reviews."

Big Motoring World was founded by Peter Waddell in 1986, starting with a small 20-car dealer pitch in Kent. It now has ten branches across the UK. Waddell, however, was effectively kicked out of the business in 2014 following allegations of inappropriate behaviour, though these are emphatically denied and legal action is ongoing. Big Motoring World is now owned by investment group Freshstream, and Waddell has moved into road haulage with Big Transport.



Warning

Big Motoring World

This company's rating is unavailable due to a breach of our guidelines.

Car dealer · 10 Locations

Write a review | Visit website

Breach of guidelines

This company has been inviting people to review them in a way which encourages positive reviews.

There is also a Facebook group entitled Big Motoring World Complaints which has 6800 members, and some of the stories listed are certainly on the face of it, concerning to put it mildly.

However, Facebook groups like this can present a misleading impression. For starters, while unhappy customers are usually keen to comment, happy ones hardly ever do. Comments are also rarely verified so may or may not be true. And even if the customer believes what they have written is 100% accurate, there are two sides to most stories, and only one of them being presented. An ongoing theme, though, seems to be high-pressure selling of extras such as warranty cover which may or may not represent good value. To be fair again, Big Motoring World are far from alone in doing this – many car supermarkets business models rely on ad-on sales for most of their profits.

Amazon selling used cars

Over in America, retail buyers will soon be able to buy ex-Hertz rental cars via Amazon. The two companies have just signed an agreement, under which cars from the Hertz fleet be offered for sale direct to the public, and online-only, via Amazon Autos. New Hyundais can already be bought this way, but the Hertz deal is the first time that pre-owned cars are being offered.

For now, Hertz used cars are being sold from sites in Dallas, Houston, Los Angeles and Seattle, but the long-term plan is to expand it to 45 sites across the USA if successful.

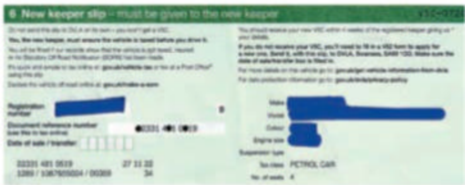
Will Hertz from Amazon ever come to the UK? There are currently no plans to do so, although Amazon and Hertz are both well-established here, and if it works stateside they may well decide to give it a go. However, the experience so far of online-only used car sales here has been pretty mixed: Cazoo flopped somewhat spectacularly, and Cinch has moved from online only to a mixed model with the online business supplemented by walk-in retail sites.

The biggest obstacle, however, is likely to be the UK's much stronger consumer regulations. American rules vary from state to state, but there are ways in which companies can sell cars to consumers on a 'final sale' basis, and without any comeback, warranty, legal protection or fit-for-purpose requirements. That cannot happen here unless the vehicle is sold via a genuine auction.

Green slip blues

As we all know, a new keeper can tax a car using the tear-off green slip on the bottom of a V5C. You can also do it online, in exactly the same way as when using the full V5C, except that you quote the V5C green slip reference number. This is actually the same as the main V5C's except for the addition of another character in front so that it's an 11-digit number rather than ten. This additional number tells the DVLA 'computer' that the car is being taxed by a new keeper.

However, because green tear-off slips are intended only for use by a new keeper, they can only be used online once. Sometimes, but not always it seems, a Post Office will also refuse to tax if the V5C green slip has already been used once, but I've also heard of cases where traders and others have been able to do this.



6 New keeper slip – must be given to the new keeper

Registration number [redacted]

Document reference number [redacted]

Date of sale / transfer

Make [redacted]

Model [redacted]

Colour [redacted]

Engine size [redacted]

Tax class PETROL CAR

Sometimes, traders will use the V5C Part 2 to tax a vehicle which they intend to use themselves for a month or two, but obviously they don't want to register it in their name, as this adds an ex-tra name to the registration record. This has a few implications. Firstly, a car which is recorded as owned in trade will be flagged as such, even if it is taxed and insured (and recorded as such online), it might attract constabulary attention.

The other point, however, is that because the computer 'thinks' the V5C green slip taxation was carried out by the new keeper, it will not be cancelled automatically when a new keeper does finally register the car. In other words, the customer can buy the tax with the car, though convincing them that this is possible might not be so easy.

Speedy!

▶ Recent revelations by Martyn the Editor regarding his speeding misdemeanour, plus a similar incident that happened to yours truly late last year, reminded me of a customer I sold a Rover 75 to back in the days when I was earning good money from selling them. As happened on quite a few occasions, I talked to the buyer a few times via email, and it turned out that he was actually a retired Anglican bishop.

As such, he seemed the ideal buyer for a top-spec Rover 75; he wanted to replace a rattly old Volvo 440 with something that would basically see him out and could be used for regular runs between Scotland and Somerset. He was not, however, in any sense a car enthusiast – indeed he told me that he didn't really like cars. Anyway, the deal was done, the car I sold him was, as all my retail cars were, a good one, and a month later I got a lovely email saying how pleased he was with it.

Next, though, something strange happened. A ticket for speeding in a Rover 75 came through my door – I think it was something like 84 on a 70mph motorway. I checked my records, and to my utter amazement it was the bishop's car.

So of course I nominated him as the driver, and as expected, I heard no more. A year or so later however, I googled his name for no particular reason, and the first thing that came up was that he had been banned from driving for six months under totting-up! He was the last person on earth I'd have expected to do that.

The problem, I'm sure was that after his rattly old Volvo, the Rover 75 was just so refined that the speed wasn't obvious. As well as the bishop, I also took a lesson from this – whenever I sold anyone a car that was a significant step-up from what they'd had previously, I always warned them to 'watch their speed.' How many actually took that advice I really wouldn't like to say, but at least my conscience was clear.

Golden oldies

▶ This is a theme which I've touched on once or twice before in the 30 years that I've been involved with *Car Mechanics*, but I came across it again recently, and it's therefore worth mentioning again as its still, it seems, relevant today. I'm talking about the way in which cars age at different rates in different parts of the country. I've recently spent a week in South Devon, catching up with a few of Sarah's friends and relatives, and revisiting a few of her haunts from younger days. While there, I couldn't help but notice that there seemed to be a lot more older cars still in everyday use. This 25-year-old Peugeot 406 belongs to someone living opposite where we stayed in Exeter; and as you can see, it looks superb – you could have driven it straight from there to an event like the Festival of the Unexceptional (see report on pages 74-75), and it wouldn't have looked at all out-of-place. But to its owner, it's clearly just the car they use to go to work, to go shopping or maybe to go around looking at some of the fabulous scenery in that part of the world. Oh, and it's a diesel as well.

It was by no means unique either. During our time there I saw more 200-Series Rovers than I have in ages, along with a fair few RWD Volvo 740s and 940s; no 240s sadly. Not all were as tidy as the 406; in fact, some were decidedly well-used. But the fact was that they were still there, and still doing what they were made to, long after cars of this kind had disappeared in other places.

There are several reasons for this. One, obviously, is that the climate in the South West tends to be kinder than in, say, Scotland. This, though, is becoming less significant as mechanical failure continues to overtake corrosion as the principal car-killer. Another is the relative remoteness, and consequent higher cost of bringing-in replacement vehicles from up-country. And finally, many retirees who move to places like Devon will bring a car with them and then, because their annual mileage is low, keep it for a long time. And when they do come to sell, chances are that the car will stay local.

However, despite older cars being more plentiful in places like Devon and Cornwall, prices are little different, as cars tend to be dearer in places where old cars survive better. In fact, the high prices are probably another reason why people keep hold of cars longer. But if you want a particular older but not-quite-classic car, or you are in an area where enthusiast interest in late nineties/early noughties cars is on the rise, casting your stock-buying net a little further afield might just be a good idea. Think too about which auctions main dealer part-exchanges from places like this might typically end up at.

TOP TIP

Though the twice-yearly registration plate change isn't anything like as important as the old annual change in August, it's still a peak for the trade. Expect more part-exes to come in from September 1.

demon tweeks
demon tweeks
demon tweeks DRIVE-2

Peter Rosenthal removes the slop out of a 2000 Porsche Boxster gear linkage by upgrading to a Ben Auto Design quick-shift kit.

When cable linkages get to a certain age, they tend to get sloppier and less precise. Much like humans! On this 24-year-old 120,000-mile Boxster 2.7, the gear linkage was tired and there was a real risk of missing gears or selecting the wrong gear and causing damage. Most of this is down to the shifter mechanism in the car – which is largely made from plastic – but it is also worth checking the cable ends at the gearbox for play (ours had very little) before you start. Any worn OE parts can be ordered from Porsche specialists such as Design 911.

From the factory, Porsche offered a shorter-throw and more precise quick-shift mechanism and while this is an obvious upgrade, it's expensive at around £400 and only comes with plastic bushes (which are a weak point and prone to wear). Happily, there are lots of good quality aftermarket kits on the market that are both cheaper and better.

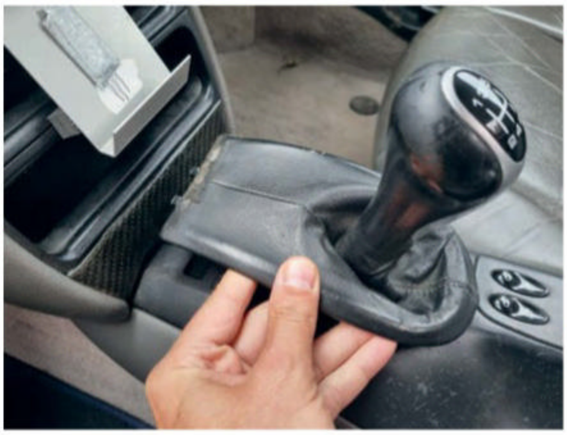
We used the Ben Auto Design, one which was ordered online from **benautodesign.fr** who are based in France. This clearly takes design inspiration from the OE Porsche quick-shift and is offered in two versions – the Classic (which retains the OE gear knob and gaiter) at £241 and the Racing version for £266 which requires an aftermarket threaded gear knob. Cheaper kits are available (eg. Design 911 offer one for £115) but these lack proper bearings in the bushes and the additional aluminium pivot arm.

Fitting it is a one-way conversion as small modifications are needed to the original housing, and it takes around two hours in total.

The improvements were dramatic and, as well as removing all the excess play from the linkage, the slightly shorter throw resulted in a mildly firmer and pleasingly mechanical feel to the shift. It's a vast improvement over the original mechanism at a significant saving over just replacing OE parts.

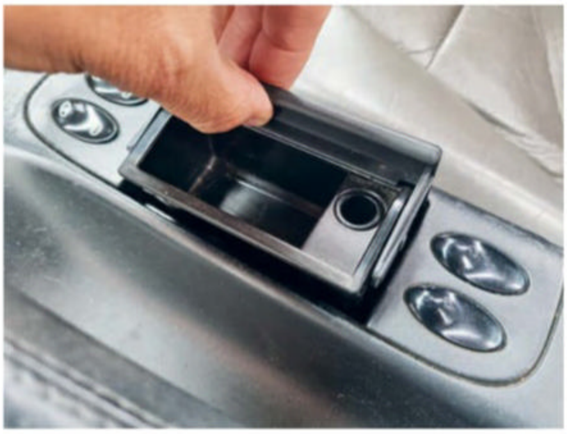
EQUIPMENT REQUIRED

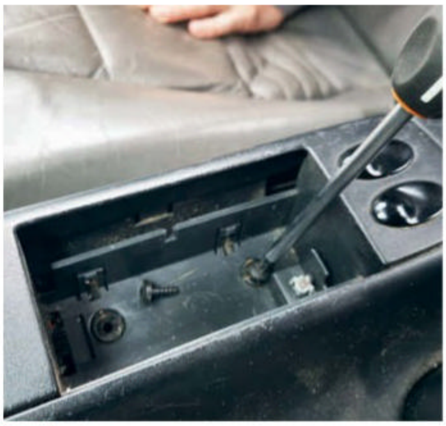
- 10mm socket and extension bar
- 3/8-inch ratchet driver or impact driver
- T20 and T30 Torx screwdrivers
- Plastic pry bars
- 19mm spanner
- 5mm and 6mm Allen keys
- Threadlock (mild grade)
- Flat-blade screwdriver
- Narrow chisel (or old flat-blade screwdriver)
- Flat-head punch
- Pliers (optional)
- Small hammer
- Small rat-tail file
- Sharpie for marking cables
- Ben Auto Design quickshift kit



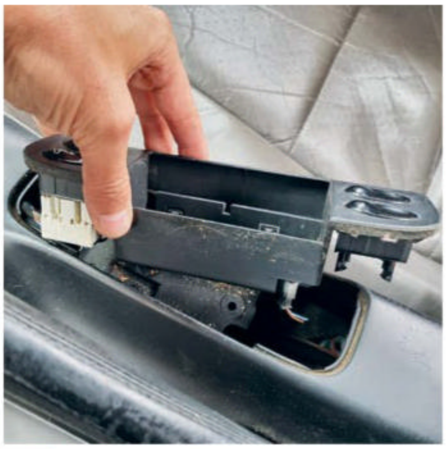
1 ◀ **Remove the original gearlever gaiter. It prys up at the rear edge and is secured be two lugs at the front edge. If you're retaining the gear lever it's easiest to remove it now. It is a very stiff push on unit so take care when removing it.**

2 ▶ **Remove the ashtray to reveal the fixings beneath. This is also a good time to clean it.**

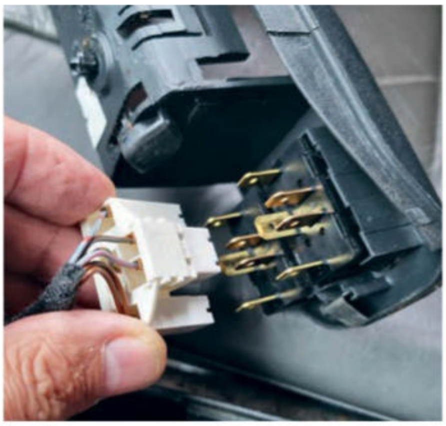




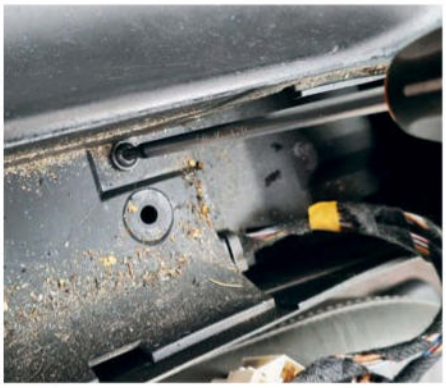
3 Under the ashtray are two T30 screws. Remove both of these to release the assembly. The bezels of these two screws also secure the unit in place.



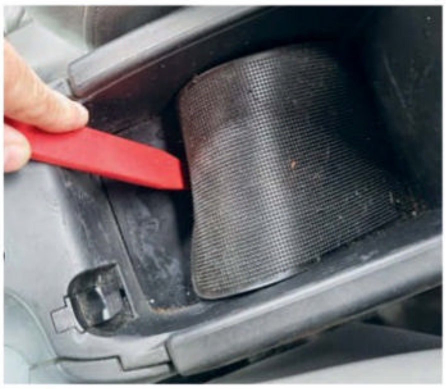
4 The ashtray and the electric window switch bezel can now be unclipped and removed from the centre console.



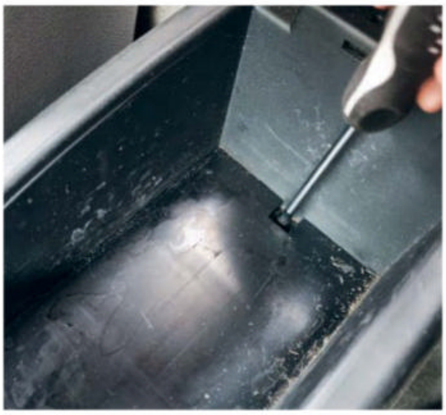
5 Unclip the black driver's side electric window switch connector together with the white one for the passenger side switch. Also unclip the ashtray illumination switch.



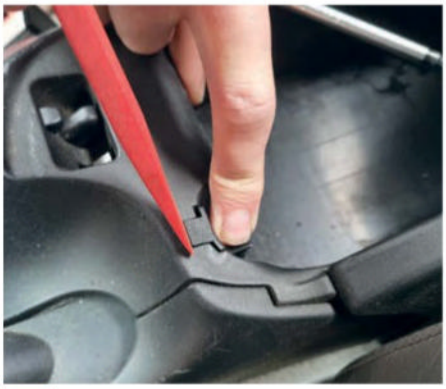
6 Underneath the window switch/ashtray assembly you'll find a hidden T20 screw – remove this and store safely.



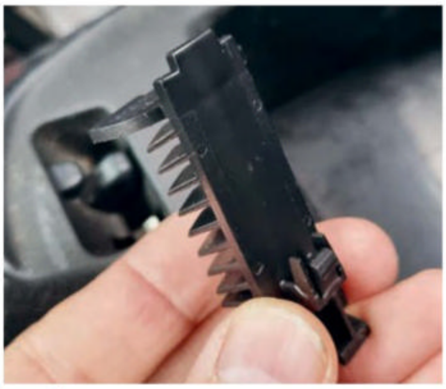
7 Lift the armrest storage lid and prise out the rubber mat at the base using a plastic pry tool.



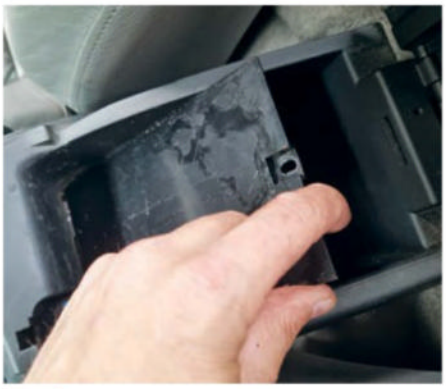
8 Remove the T20 screw that secures the plastic base plate in place.



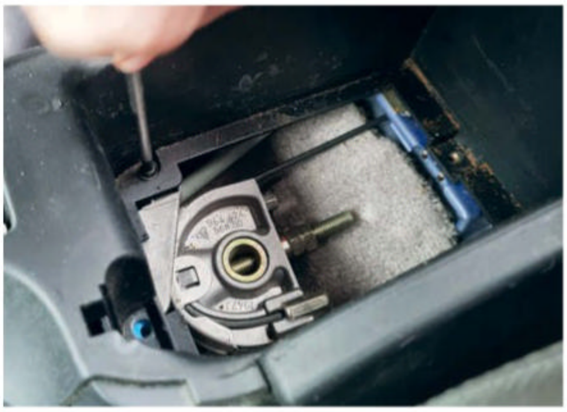
9 At the front edge of the storage bin, use a plastic pry tool to ease out the screw cover.



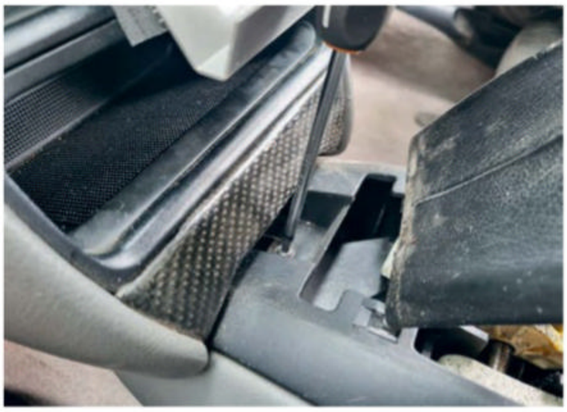
10 The screw cover itself has rather an odd design and is quite fiddly to remove if it hasn't been out before.



11 Lift out the plastic base tray at the lower edge of the centre console storage bin.

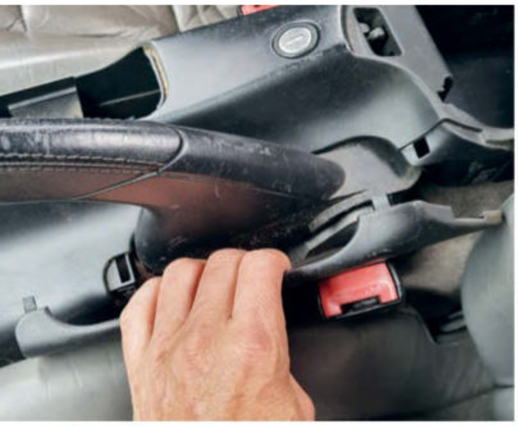


12 ◀ This then reveals both access to the handbrake adjustment mechanism and a hidden T20 Torx screw that holds the rear section in place.



13 ▶ Remove the front T20 Torx screw and the whole centre console should start to come loose. If it doesn't check you haven't missed out a screw.

⇨

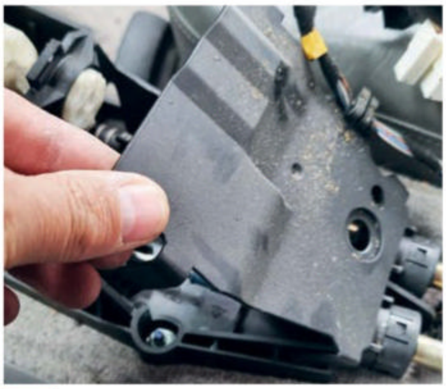


14 The plastic trim around the handbrake lever also needs to be removed by pulling it towards the passenger seat and then upwards.

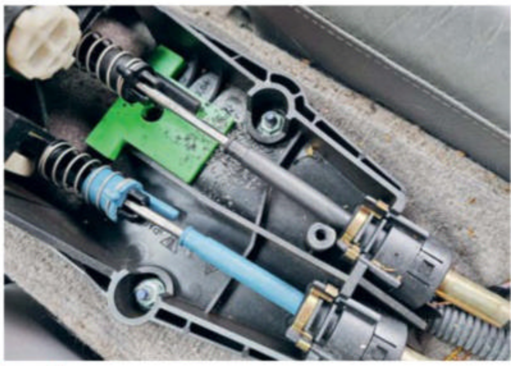
15 The whole centre console should now be loose and can be removed (for extra clearance the side panel can also be unclipped). You'll need to tilt the driver's seat forward for extra clearance.

16 Unhook the centre console from around the gear lever and carefully manoeuvre the centre console out of the tunnel taking care not to damage the seat or handbrake leather trim. It's quite fiddly so take your time.

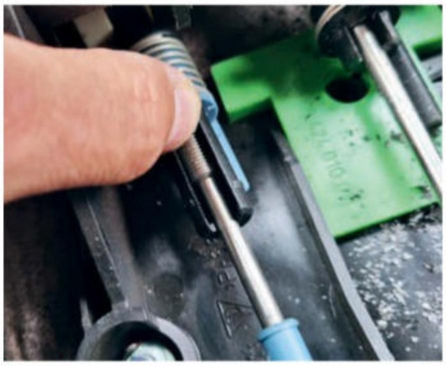
17 Once you've got the centre console around the handbrake lever you can then rotate it a little and feed the gear knob and gaiter out through the gear lever hole to release the whole unit.



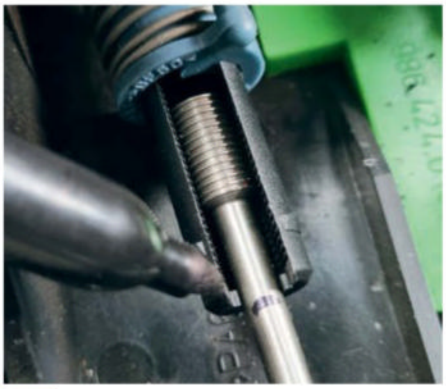
18 To gain access to the gear linkage cables, this plastic cover must be unclipped and lifted out of the way.



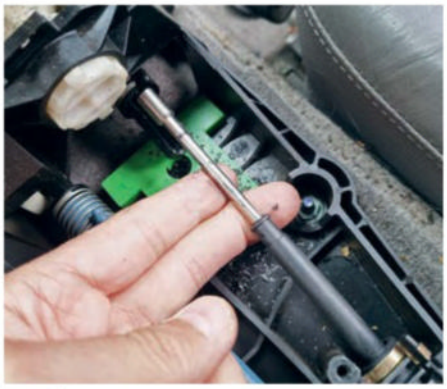
19 You can see evidence of wear in this linkage mechanism, but the cables themselves look fine, and the housing is also in great condition.



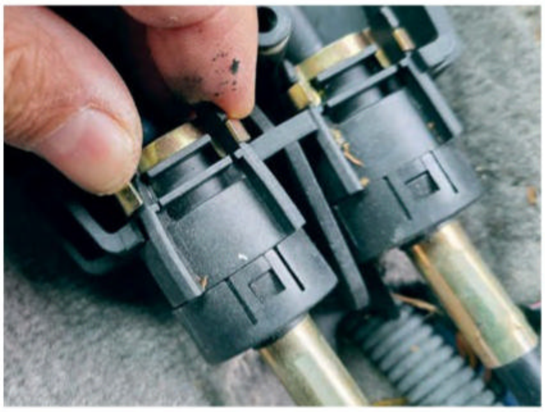
20 The ends of the cables must now be unclipped. To do this simply push the sprung end towards the front of the car and then rotate it clockwise to lock it in place.



21 Before removing the threaded end of the cable, mark it with a permanent marker pen so you know the position of the cable.

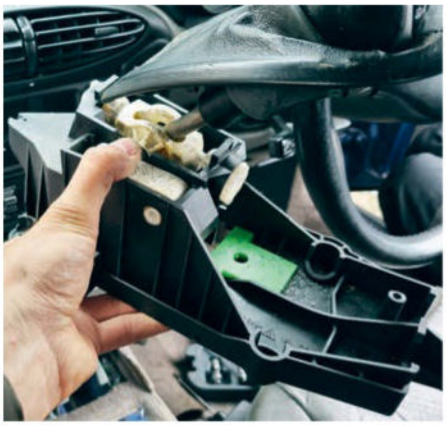


22 With both cable ends marked, unclip the threaded cable ends by lifting them upwards. They will unclip quite easily.

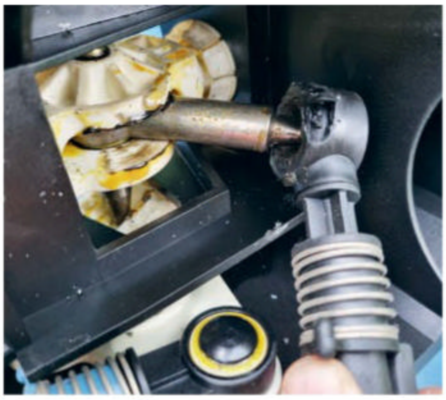


23 ◀ The cable end securing metal clips now need to be squeezed together to remove them from the gear lever housing. They're quite stiff so pliers may be needed – squeeze the metal ends together and lift upwards.

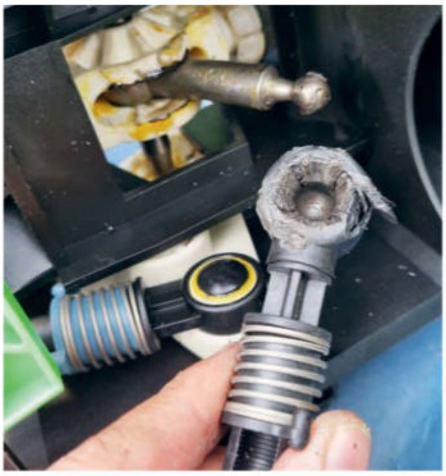
24 ▶ The whole gear lever assembly can now be removed from the car. It's secured by four 10mm nuts at each corner that are easily accessible with an extension bar and impact wrench.



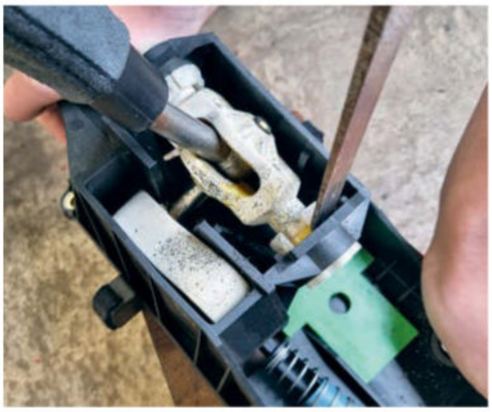
25 Now remove the whole gear lever assembly from the car so you can safely remove the old parts without damaging any of the surrounding parts of the car.



26 You can see why the linkage is so prone to wear – it's a plastic unit with plastic end bushes. The black cable end on the gear linkage had a torn rubber end but no play so this was reused (replacements are under £20).

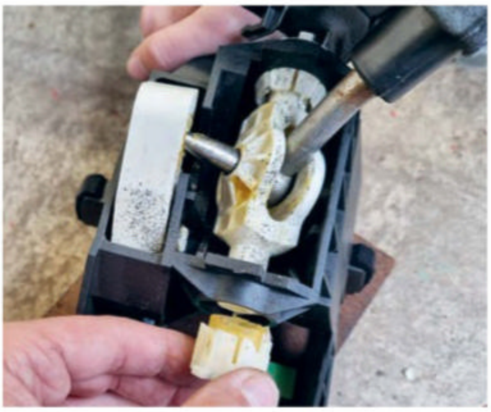


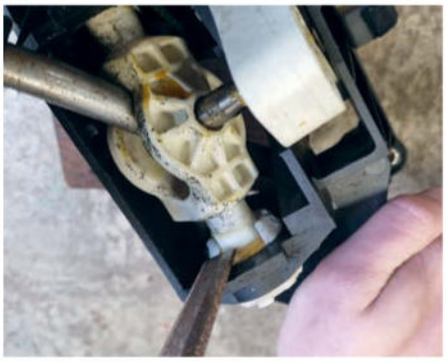
27 Pull off the black cable end by twisting it off the bottom of the gear lever.



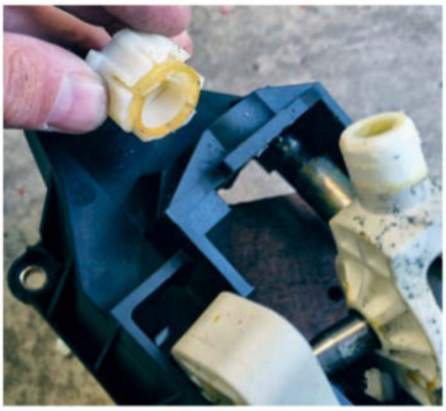
28 ◀ This is the point of no return – you must remove the two white plastic bushes by carefully breaking off the lugs around rim by tapping them with a chisel and a small hammer. This is easy as they will be brittle and age-hardened. Take care not to nick the black plastic housing as this needs to be reused.

29 ▶ With most of the white plastic lugs snapped off, the white plastic bush can be wiggled out of the black housing and discarded. These parts wear and are the main culprit for excess movement and sloppiness in the mechanism.

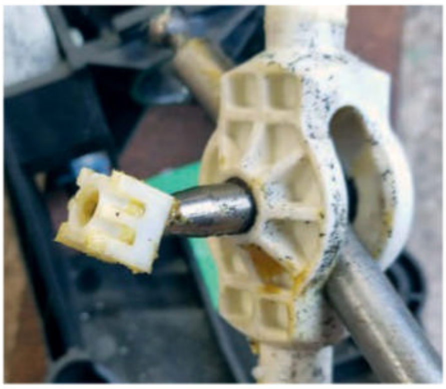




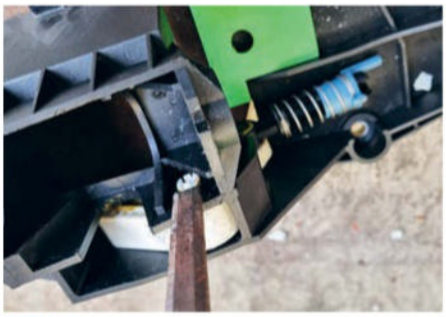
30 Repeat the process for the front plastic bush by breaking off the plastic lugs around the bezel. An old flat-blade screwdriver can also be used for this if you're worried about damaging the black plastic housing.



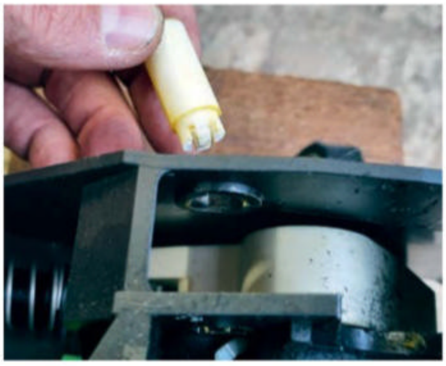
31 With the front bush removed and discarded, the whole gear lever assembly should now be loose and able to be removed.



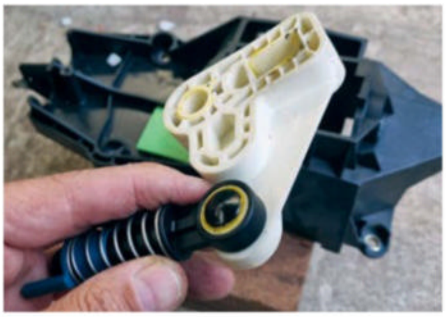
32 All these white plastic components control the fore-aft and the side-to-side movement and over time they wear down and cause the slack and floppy feel to the lever.



33 To remove the pivot arm, use the chisel and hammer to gently break off the inner lugs. It helps to have an assistant firmly hold the gear lever housing in place. Take care not to nick or score the black plastic housing.

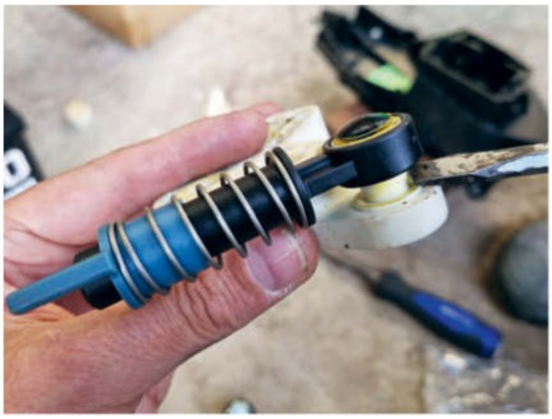


34 The original plastic pivot arm (another source of slop) can now be withdrawn from the housing.



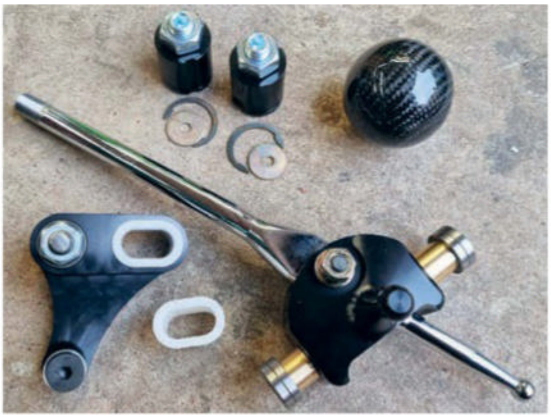
35 With the pivot arm removed, the whole pivot arm assembly can be taken out. Check for any play in the black plastic cable end as this is reused. Replacement cable ends are £20. This one was fine and could be reused.

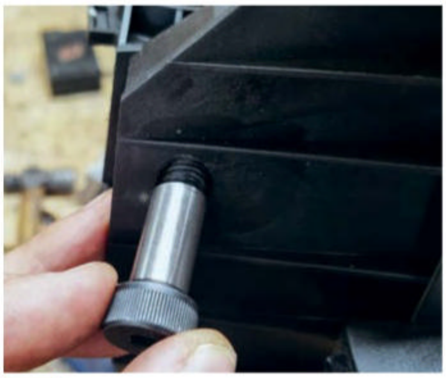
⇨



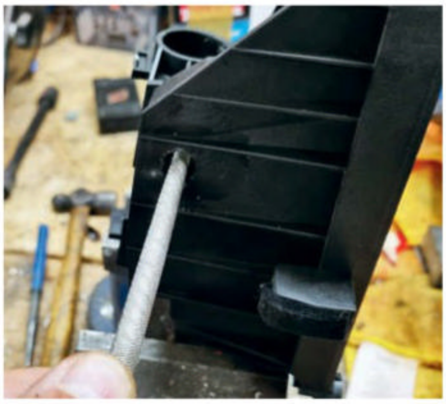
36 ◀ Carefully pry off the black plastic clip that secures the cable end to the pivot arm. It should come off fairly easily.

37 ▶ This is the new Ben Auto Design short shifter kit which comes complete with a new aluminium pivot arm and double ball-raced ends for minimal friction. This is the Racing version for aftermarket gear knobs, so order the Classic model to retain the original gear knob and gaiter.

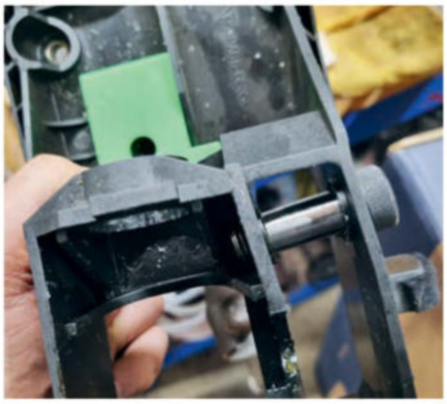




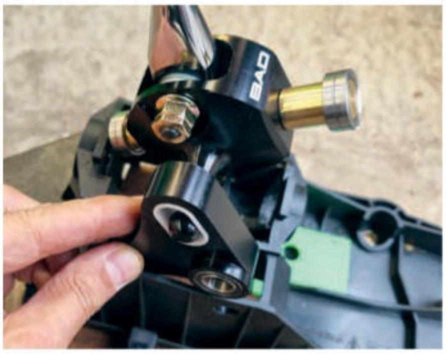
38 With the gear lever housing securely supported in a vice (or by an assistant), test fit the pivot arm bolt and sleeve. As the original hole has a slight flat it probably won't fit immediately.



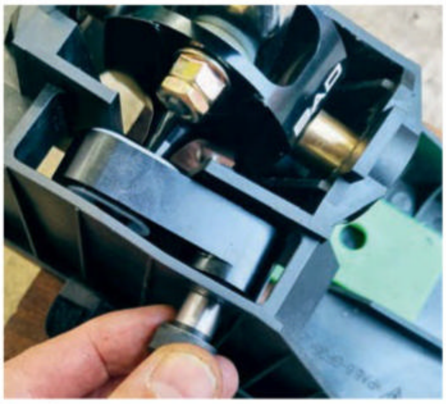
39 Remove the flat section on the housing hole by gently filing it down with a small rat-tail file. Only remove a little bit at a time and keep checking the pivot bolt and sleeve.



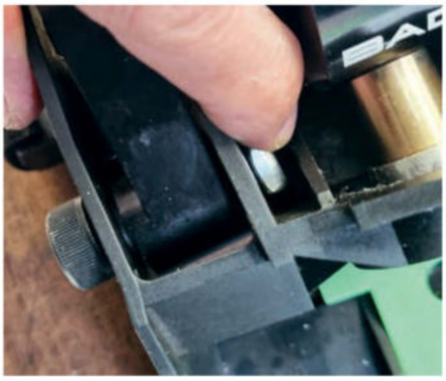
40 Check that the pivot bolt and sleeve now fit perfectly in the hole. It wants to be a tight fit so that no play is transmitted to the linkage.



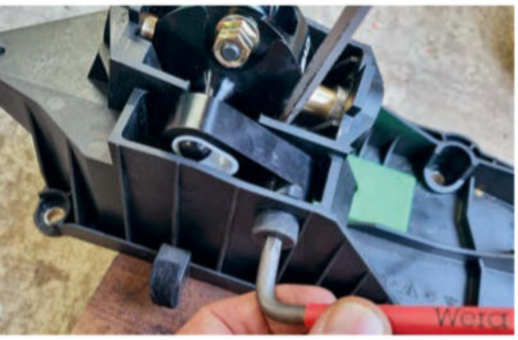
41 Slot the pivot bearing arm over the new gear lever and feed it into the original gear lever housing. It only fits in one way so it's hard to get this wrong. Make sure no bearings fall off.



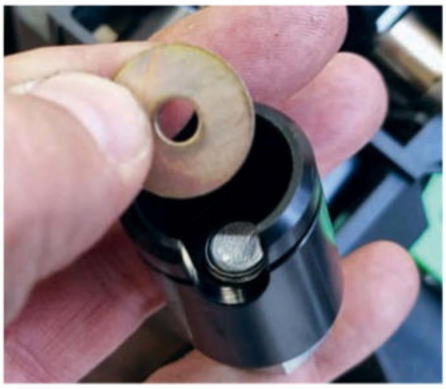
42 Now fit the pivot arm bolt and sleeve in place. The arm rotates on a bearing, so no lubricant is required.



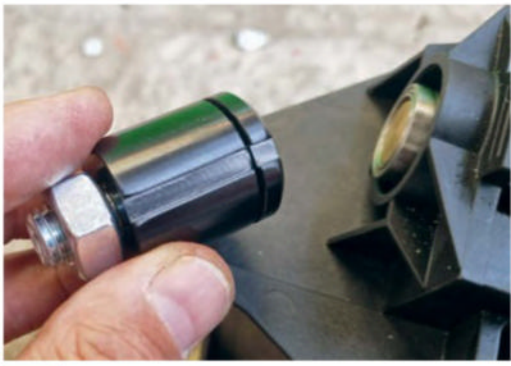
43 Attach the half nut to the end of the pivot arm bolt. This is fiddly as access is very limited so you'll need to do it by fingertip feel.



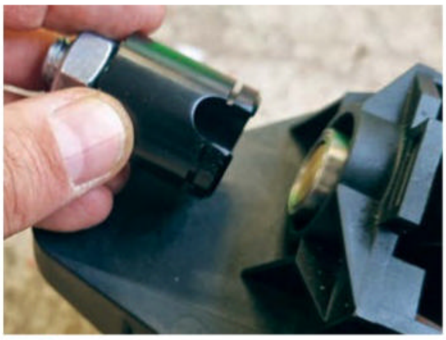
44 Tighten the pivot bolt with a 6mm Allen key and use a flat-blade screwdriver on the nut to stop it rotating (there's no room for a spanner). It doesn't need to mega tight (or it might pinch the edge of the pivot arm).



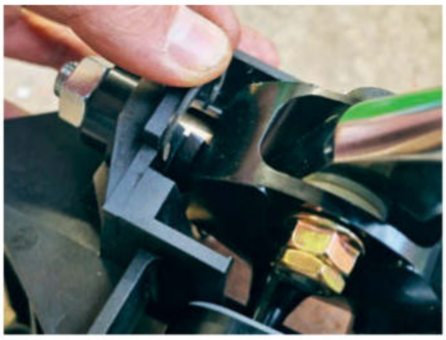
45 The bearing cups now need to be prepared by placing the washer on the inner section.



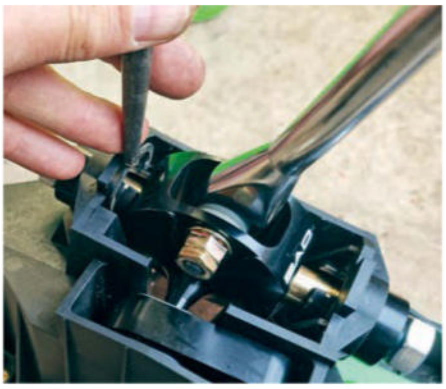
46 These aluminium bearing cups have an orientation groove machined into their lower edge. This needs to face downwards in the black plastic housing.



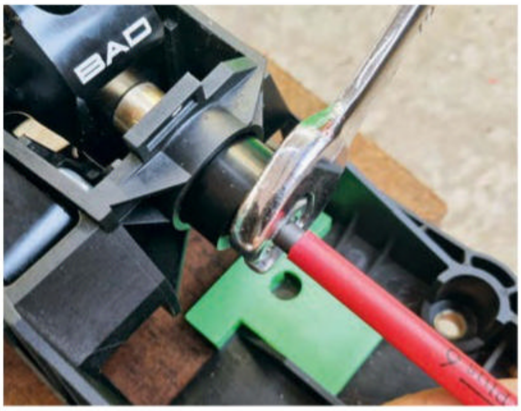
47 This is the orientation of the bearing cup in the main gear lever housing. The semi-circular cut out is designed to be used with a screwdriver to prevent the unit rotating during tightening and faces upwards.



48 Slide the bearing cup through the black plastic housing and over the two bearings at the end of the gear linkage. Push the supplied circlip into the retaining groove on the bearing cup.

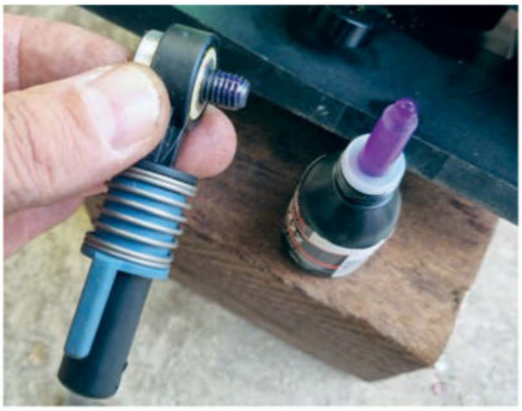


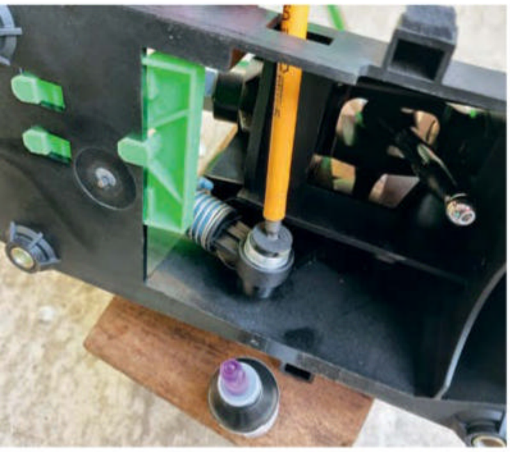
49 The circlips can be a little tight so they might need a tap with a flat punch and a hammer to secure them in place.



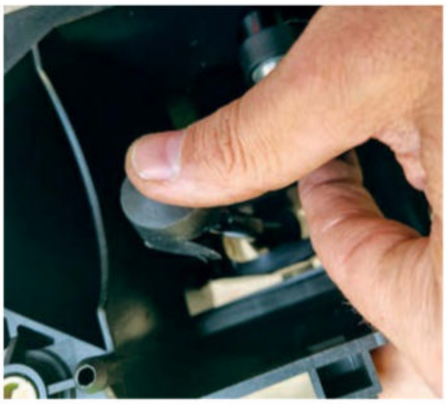
50 ◀ Fit the other bearing retaining cup at the other end of the gear lever in exactly the same way. With both bearing cup circlips in place, tighten up the nuts on the end with a 19mm spanner, using a 6mm Allen key to prevent the centre stud rotating. These adjust the fore-aft movement of the lever and can be adjusted later.

51 ▶ Refit the lower blue cable securing arm to the pivot arm with the supplied bolt. Apply a dab of low strength threadlock to the bolt to be on the safe side.

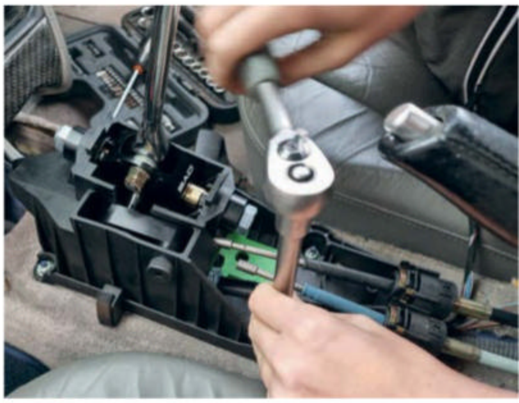




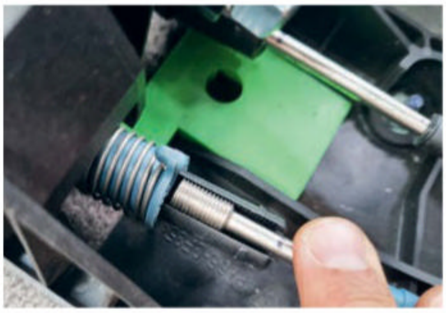
52 Using a 5mm Allen key, tighten the cable securing end to the pivot arm.



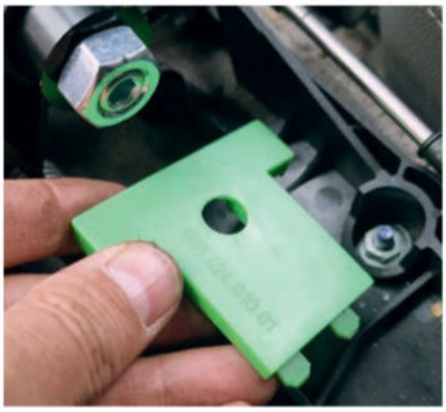
53 Refit the other black cable end clip be pressing it firmly in place over the bottom of the new gear lever. If there's any play at all in this cable end, replace it with a new one.



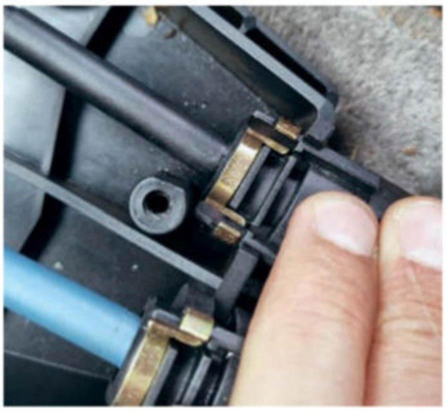
54 The whole assembly is now ready to refit in the car – tighten its four 10mm nuts in place in a diagonal pattern until they're snug.



55 Refit the cable ends by clicking them in place and aligning them with the marker pen lines of the original unit. They're coloured-coded – blue cable to blue clip, black cable to black clip. Rotate the sprung end of the cable anti-clockwise and the spring clips should pop back to lock the cables in place.

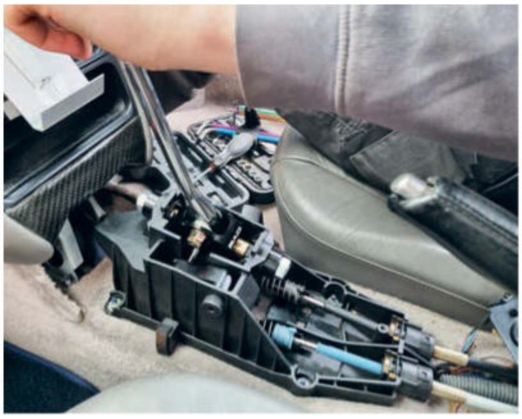


56 This green plastic spacer fouled on one of the cables so it was discarded from the gear lever housing. It just unclips.



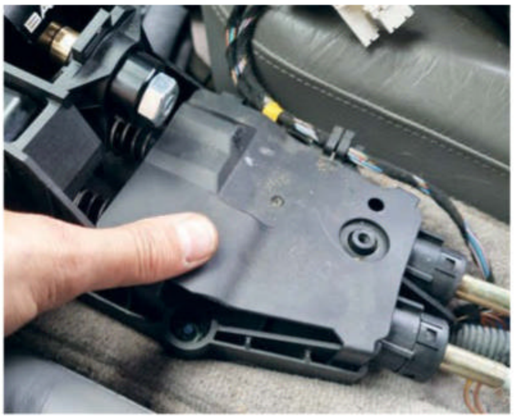
57 With both cable ends secure, push the cable securing clips firmly back in place on the gear linkage housing.

Porsche Boxster 2.7 quick-shift gear linkage fit

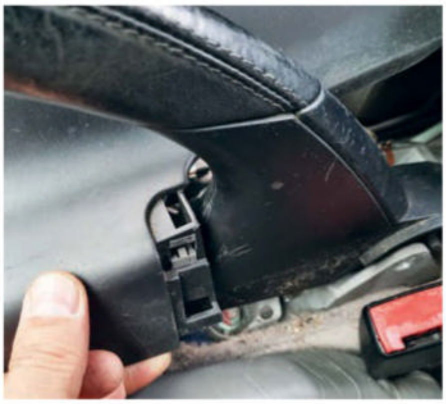


58 ◀ Before refitting the centre console, check that all gears can be selected and adjust the play and fore-aft movement by carefully loosening/tightening the nuts on each end of the gear lever. You should be able to select all gears with ease, but it will feel a lot firmer than before (it will ease up on the first drive).

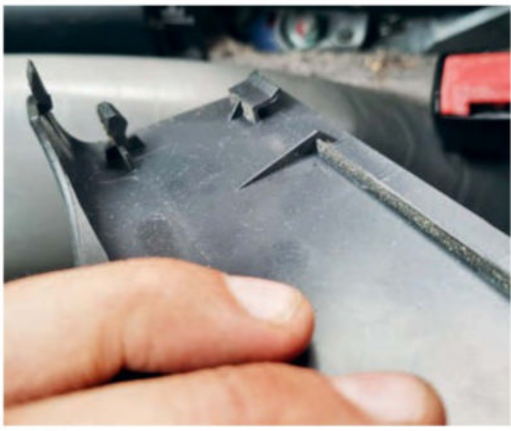
59 ▶ Once you're happy with the feel of the new lever and bushes and that all gears can be selected, all the original trim can be refitted, starting off with the cable cover which just clips in place.



60 Waggle the centre console back in place taking care not to damage the seats or any other surrounding plastic trim.

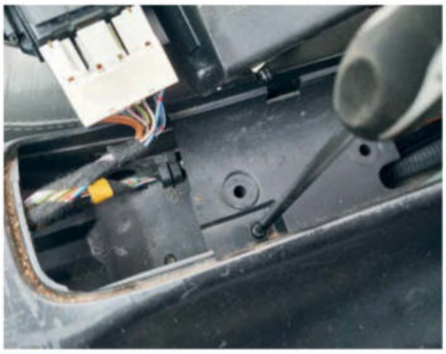


61 Make sure this part of the centre console is hooked around the handbrake lever and take care not to damage the leather trim covering the handle.

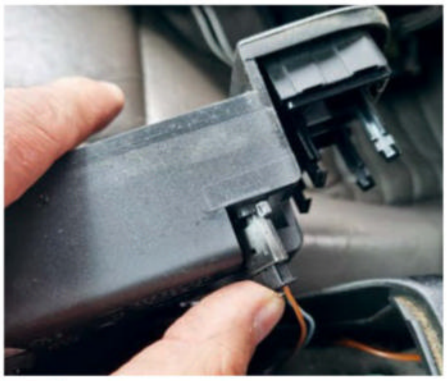


62 Refit the trim around the handbrake lever – it hooks in place at the lower edge by fitting it in at a slight angle.

63 The upper edge of the handbrake trim can then be firmly clipped back in place to secure it.



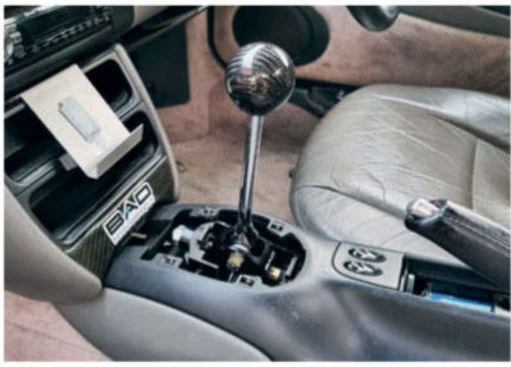
64 Refit the screw that secures the central section of the centre console, together with the screws under the storage bin (and front edge) and the screw in front of the gear lever. Refit the nut cover and rubber storage tray base.



65 Refit the ashtray illumination wire to the underside of the window switch/ashtray bezel, together with the black and white connectors for the electric window switches.

66 Clip the window switch/ashtray bezel back in place and refit the two securing screws followed by the ashtray itself.

67 If you're using the Racing gear lever, you'll need to use a screw-on gear knob. This neat carbon one was supplied by Ben Auto Design.



68 This is the finished unit. You can fit an aftermarket leather gaiter to hide the mechanism but in this case, it was left exposed for easier adjustment and that motorsport look.

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GENERAL

AGM battery fitment

Q If you fitted a standard lead/acid battery of the same Ah and CCA ratings to a vehicle that was originally fitted with a EFB or AGM battery with a Stop-Start system, what problems could you encounter apart from the Stop-Start not functioning correctly, i.e. potential faults with the charging system or other electrical systems.

Thanks in advance for your advice.

Craig Christie

A If you were to replace a battery which should be a EFB or AGM battery with a standard lead-acid battery, the short answer is that the battery would not last as long as it should.

The smart charging systems used on batteries that are intended to be an EFB or AGM fitment, do operate in a manner that uses the deep cycle capabilities of the battery.

The EFB battery is an 'enhanced flooded battery' and this is a step up from the traditional lead-acid battery that has been used for a number of years. It has the durability to handle harsh conditions with larger power demands and recharge cycles. They are used in vehicles with a smaller demand but those that do have the Stop-Start technology.

Vehicles fitted with an EFB type battery need either this or an AGM battery fitted when it requires replacement because the battery monitoring/charging system will be built to accommodate this type of battery in the charging system.

The AGM battery is a step further in technology and this is an Absorbent Glass Mat type of battery. They are superior to the EFB battery and can cope with a much higher charging cycle and the power demand from Stop-Start vehicles with a larger engine. If the vehicle is designed to be fitted with an AGM battery, then even the EFB battery will not be suitable as this will not be able to easily meet the charging requirements and power demands.

It is these charging and power demands that would quickly reduce the life of a battery that does not meet the technology fitted to the vehicle. So, whilst for the first few weeks the difference may not be noticed, the basic battery would soon be depleted and not able to meet the demands from the electronic systems in the vehicle. This would mean that as well as the Stop-Start system, the stability of the voltage would not be maintained and this could also prevent some electronic control systems from operating.

GENERAL

Water from the exhaust

Q I have noticed a lot of water coming out of my exhaust lately as I as currently doing short journeys. Driving for longer at higher speeds should evaporate the excess water as stream but would a tiny 1mm hole drilled into the last back box of my Walker's exhaust at the lowest point be a good idea or syphon the water out with a tube up the exhaust pipe? Would a hole increase the Lambda on an emissions test and fail the MOT?

Also, the exhaust has a big bend in the pipe to get it up and over the rear axle beam before the rear box so would there be a lot of water trapped before this bend which would have difficulty getting out of the system? The engine oil looks OK, but there is a slight mayonnaise on the oil filler cap which I have always had during the winter that goes away in the summer months. Thanks again for your help.

Andrew Rosier

A Thirty years ago before the addition of catalytic converters and more advanced injection systems, the idea of drilling a hole in the base of the rear box to allow the excess moisture to drain out and so save the possible rust from forming in the inside of the exhaust box, was a valid idea and often practised.

I would not advise this to be done now as it will upset the balance of the system and could lead to an incorrect O_2 reading from the sensors.

The water content is now much higher in the modern vehicle as the process converts the harmful oxidation of hydrocarbons into carbon dioxide and water. In vehicles that were produced prior to the use of the catalytic converter, the water emitted from the exhaust was purely that which was draw into the engine from moisture in the air and the residue of the fuel.

Now with the added chemical process within the catalytic converter, the exhaust does have a higher water content, and this is often very visible. The good news is that the exhaust system is made to cope, and I regularly work on vehicles well in excess of ten years old that still have the original exhaust system (including my Honda).

Whilst I do not think this is necessary if you did want to drill a hole to drain any excess fluid, I would advise that you then filled the hole with a self-tapping screw, of a suitable size. This could be periodically removed and would ensure that the system is otherwise sealed and operational as it was designed to be.

It would be very unusual to have any moisture in the centre section before the pipe going over the rear axle as this will even on a shorter journey normally warm up to a sufficient temperature to ensure that any moisture in this area will condensate off and travel to the rear of the exhaust system.

Mayonnaise in the cam cover and on the oil filler cap is a separate issue and normally caused by the condensation internally in the engine gathering at the highest spot (the cam-cover) and then the cold flow of air over the cam-cover causes the collection of condensation and oil to create the mayonnaise type milky residue. When the engine covers longer runs or when the weather warms up this does then disperse and condense off.

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FORD CONNECT

Smoke under acceleration

Q I have a 2006 Ford Connect 1.8 TDDi, which has covered 143k and is ex-Royal mail. I have owned it since 2015 when it had 77k. It has had a recent oil change, and this is always religiously done every six months or 6000 miles. The fuel and air filters were replaced 10 months ago.

A new fuel pump (OE) was fitted in 2020 as the old one completely failed. The cost from the factors was £630 incl VAT but I expect garage had its mark up.

There is black smoke, but only on harsh acceleration, ie. from 2nd-3rd gear if I boot it to 4000 revs. Black smoke burst more so after pottering around in urban areas stop/start (courier delivery work).

Dual carriageway cruising, no smoke. I tried STP additive approx. 125ml per tank no joy.

My good friend (mechanic) said older diesels all smoke a little under harsh acceleration. Is that correct? I use supermarket fuel as it's cheapest. When the fuel pump was replaced, I assume pump is just fitted and system bled. The van passed the MOT recently and the emissions were OK.

Any ideas appreciated.

Antony Rippon

A The black smoke when it appears, is indicating that an incorrect mixture is present. If continually rolling out of the exhaust this would possibly be an air leak in the induction system, or a misfuelling problem. But as this only appears at times of harsh acceleration, this does indicate that currently the fuel/air ratio is wrong.

This can be due to a delay in the injectors operation an air restriction which under the harder acceleration is preventing a good flow of air or a leak in the induction system is allowing air to escape from the system under pressure.

Provided that the induction pipes are all good, and that the injectors are in good order, the cause of the issue may be a slowly operating EGR valve, and it would certainly be worth cleaning this.

Your friend is correct to some extent as it is not unusual for older diesel engine to emit a puff of black smoke under harsh acceleration. But the quantity of this will determine if the problem needs further investigation.

If this puff of black smoke is more of a plume, and if it does cause problems to following motorists, then this should certainly be addressed.

If this is the case then I would start by checking the induction system for any leaks, check the EGR valve operation to ensure this is working correctly, and then check the injectors – if these are the original injectors, it may be worth having them checked, as this may be the source of the problem – and if the injectors are the problem, then the smoke may slowly increase.

FORD GALAXY

Heating problems

Q My 55-plate 1.9 TD (130PS) Ford Galaxy has developed a strange fault with the heater inside the car. Firstly, the heater output (the warmth from the heater behind the dashboard) inside the car is now cold (permanently), and secondly the temperature gauge goes from halfway (90°C) up into the red from time-to-time.

The oil and the coolant levels are both fine, and the cooler isn't pressurised. It is a bit worrying when the temperature gauge goes up into the red! (but not permanently). Otherwise the car seems to drive normally. Any ideas would be greatly appreciated.

Andrea Cross

The electric cooling system pump fitted on the Ford Galaxy 1.9 diesel.

A From the details you have given, I would suspect that the failure of the heating is connected to the warning for the engine temperature, and this may be due to an airlock in the cooling system or circulation problems.

I would start by checking the coolant flow through the heater assembly to ensure that coolant is flowing correctly, by removing one of the heater hoses from under the bonnet, you should be able to ensure that the coolant is flowing through the system OK.

If there is a flow, then it may be a problem with the water pump or the thermostat, although I would have expected more symptoms if one of these components was to blame for the problem, but it is possible that the fault is intermittent.

Some models did also utilise an electronic pump in the cooling system and if your Galaxy does have this pump fitted, then it is possible that the operation of this pump is the source of the problem and is failing intermittently – this could also be giving the symptoms you have.

As you do see the temperature gauge rise to the red on occasions, I would investigate this side of the matter first, checking the thermostat along with the water pump and electric pump (if fitted) along with checking the flow of the system.

I would hope that after these checks the reason for the problem will be discovered.

FORD FOCUS

Economy battery

Q I have a 2014 Ford Focus 1.6 Diesel, and I need to replace the 12V battery. I'm wondering if I can use a regular car battery with the correct voltage and amps instead of the expensive Stop-Start battery that is recommended. An important note is that I always have the Stop-Start function disabled as I do not like this system.

Peter Phillips

A This would cause a problem as your Ford is fitted with a battery condition monitor, and unless the correct battery is fitted the monitoring system will not operate correctly. This will lead to the battery not getting the correct charge and so it will slowly calcify.

In short, a battery of the same amps and voltage would in the short-term not appear to be a problem, but over the course of 18 months this will then deteriorate and not give the required performance as it will not be able to deep cycle.

The smart charge system on your Ford does require the correct battery to operate as intended. In the long-term this saving from buying a lower specification battery will be negated by the need to replace the battery after a shorter period of time, and it may also let you down.

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FORD KUGA

Coolant loss

Q My daughter bought a 17-plate Ford Kuga with the 1.5 EcoBoost petrol engine. It has now started to lose coolant with no apparent leaks inside or outside of the car and no sign of water in the oil. Just lately, starting when warm, it misses for a few seconds. Prior to the missing becoming obvious I had managed to bypass the exchange unit that's part of the inlet manifold to rule it out.

Reading online it seems they have a problem with the design of the block (class actions in the States and Australia), in that the surface area for the head gasket on top of the liners is insufficient. I've asked my local Ford dealer if they knew of the problem or had any success in replacing head gaskets but to no avail!

I wondered if you had any experience of this problem. On the American websites it seems replacing the gasket is a waste of time and the only answer is a short block.

My daughter's engine code is M9MD I was wondering about fitting a M9ME which I believe has the modified block?

Am I right in thinking flexi plates and flywheels will be interchangeable as my daughters is an auto?

Cavan Driscoll

A The symptoms described do appear to point to the cylinder-head gasket failing, and the light misfire when first starting up, would be evidence of this. To confirm the problem, it would be worth removing the spark plugs before starting to see if a light misting of moisture is present. If it is this would certainly confirm the situation.

I would also confirm that not all head gasket failures will result in coolant in the oil, and so this would not be a defining point.

The M9ME engine did have redesigned waterways, and this was done to rectify the earlier issues. The M9ME engine will fit into the Kuga models from 2014 onwards and so would fit into your daughter's model.

You would need to inform your insurance company as even though the internal specifications are identical (bore and stroke), the engine does have a different power output – 129kW as opposed to the 134kW of the M9MD). The slightly different power output may be due to the ECU settings, and this may need to be adjusted to suit.

From the details I have, the same crankshaft is used in both the automatic and manual vehicles and so this would not be a concern.

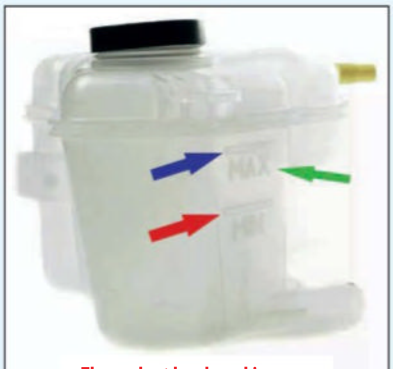
I would like to say that replacing the head gasket may be all that is needed, but with the possibility of a cracked cylinder-head, or liners that have failed, I would suspect that the replacement of the engine with the later variant may be the best long-term option.

FORD FIESTA

Expansion tank markings

Q On a 1.2 petrol Ford Fiesta Mk6 expansion bottle there is a moulded line approximately halfway up. Just below this line is moulded 'min' and just above is moulded 'max'. It's difficult to see if there are any more marks/lines, so question is... is this visible line the min level or the max level, if it's the min mark where is max level? Thanks for your help.

Dave Bennett



The coolant level markings are not so clear on an older expansion tank, so I have highlighted here.

A If this is the original Ford expansion tank fitted, it should have a line above the moulded wording 'MIN' and a line above the moulded wording 'MAX'. These are the guidelines and the accepted level is anywhere between these lines.

For clarity, I have added a picture of the Ford expansion tank with the 'MAX' line marked with a blue arrow and the 'MIN' line marked with a red arrow. I have also added a green arrow to show the accepted level.

FORD B-MAX

Clunky gearbox

Q My friend has a 2013 Ford B-MAX 1.6 16v (I think it has the PowerShift gearbox). She bought it in 2019 at 33,000 miles from a Ford dealer and has used their servicing scheme ever since. It is now on 66,000 miles. Last year the gearchanges became very clunky. This could be cured by putting the battery on charge. We replaced the battery six months ago and all was OK until recently when the clunking returned. Again, charging the battery helped.

I have spoken to friends who say change the oil and filter, not a cheap job. I don't think this would have been done as part of the servicing. The Ford dealer can do a diagnostic and health check for £79 but they did this last year and there was no mention of the intermittent gearbox problem. Is it worth getting it done?

Apart from the gearbox, the car is in very good condition. What do you advise? Many thanks for any help.

John Fisher

A The transmission unit in this model, has been known to suffer from a few problems. One of these was a leaking oil seal, and I would hope that having been Ford serviced that this is not the fault in this case.

Due to the operation of these gearboxes, I would advise a transmission oil change is carried out, but from the description, this may be one of the other issues that did occur on this gearbox. This was a communication problem internally due to poor solder joints.

It is also possible that the gearbox is not directly the problem and that this is the connection between the voltage of the battery and the clunking, which does suggest that this may be more a voltage supply problem. Like all electronic units a steady 12-volt supply is crucial, and the need to charge the battery to restore the correct operation may be suggesting that the vehicle charging system is the cause of the problem.

I would be inclined to check the charging system on the vehicle. This is a smart charge system and although it may appear to be working it could be the case that it is not keeping the voltage at the correct level, allowing the battery to deteriorate.

It may be worth having the health check carried out by Ford and alerting them beforehand of the need to charge the battery to maintain a clean gearchange. They will then be able to pay special attention to the live data of the charging system and may be able to find the root cause of the problem.

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VAUXHALL VIVARO

DPF problems

Q I contacted you around August last year regarding my 2019 Vauxhall Vivaro 1.5 diesel (BlueInjection) about DPF problems. Taking note of your advice, I had the garage where it is serviced do a forced regeneration. All has been well until today when again the engine symbol appeared with my cheap code reader, showing code 2002 DPF.

I have been using only Shell V-Power diesel, and although I do not do a lot of miles a year, most usage involves 40-to-50-mile runs. My concern is why, as you pointed out, the DPF symbol does not appear – is this an indication of another problem somewhere that it is not trying to regenerate normally? I would value your thoughts on this. At 77-years-old I cannot service my vehicle as I used to do, but I still have the vehicle serviced every year even if only 4000 has been done, not the silly 25,000 Vauxhall state. Thank you for any help you can give. PS... I have been quoted around £1500 for a new DPF but as above would the new unit not be regenerated?

John Gudgin

The DPF sensor and pipes may be the reason for the DPF not regenerating.

A The code P2002 is indicating that the Particulate trap, bank 1 efficiency is below the desired threshold, so this is showing that the DPF is partially blocked and requires regeneration. The DPF should automatically regenerate during normal driving and can become blocked if the driving pattern does not allow the automatic regeneration to take place. This regeneration is initiated by indirectly injecting Diesel fuel into the exhaust system during the exhaust stroke.

This automatic regeneration does not appear to be operating on your Vauxhall and I would confirm your concern that this is very likely due to one of the systems failing and preventing the engine control unit for receiving the information that would otherwise trigger the regeneration.

This would of course mean that if the DPF were replaced, this would happen again when the DPF became full as the regeneration process would not be carried out.

The system is alerted to the DPF needing regeneration from the pressure sensor – this is a passive sensor and relies on obtaining the pressure difference between the front of the DPF and the rear, by measuring the pressures using a pipe connected to the sensor from the front and another connected at the rear.

Whilst it is a common scenario for one of these pipes to become blocked. It can also be the case that one of the pipes has failed and either of these situations can prevent the pressure sensor from operating correctly.

The new sensor normally comes complete with the connecting pipes, and I would suggest that the sensor and pipes are renewed before considering replacing the DPF.

VAUXHALL INSIGNIA

Starting & charging

Q I recently bought a 66-reg Vauxhall Insignia estate with the 2.0-litre CDTi diesel engine (B20DTH 168bhp) and 76,000 miles. I like the car, but it has one recurring fault: it stalls easily and often. When manoeuvring slowly the engine will suddenly cut out, even going from first to second in slow moving traffic.

I could probably live with that, but it then refuses to start. Online I get the impression that this fault is common on Vauxhalls. My garage, in whom I have total confidence, tell me it is a characteristic of the car. They checked earth points and the EGR valve, and did a full service plus, at my request in view of mileage, a change of timing belt.

I seldom stall now but I must concentrate hard all the time. I watch the rev counter and drive in first gear through urban areas with speed bumps, and slip the clutch a lot – hard on the engine, fuel consumption, the clutch, and the environment.

Restarting after a stall is a pain. Initially a restart is impossible. I am still not clear on best procedure, but I think it requires switching off, handbrake on (an electric one so a total pain!), clutch down and foot on brake, ignition on and wait a second then a further stab on the key to trigger the starter.

A petrol head like me can live with such fun but my wife refuses to drive the car, and another family with an identical situation – same Insignia – and a family member who refuses to drive it because it stalls easily.

Iain Gill

A It is difficult to understand how a garage could describe cutting out as a characteristic, as the engine cutting out is not an ideal situation. The refusal to easily start after this has occurred does lead me to believe that the problem may be in the fuel delivery side of the engine.

While there are a couple of common faults that can occur with this engine, the symptoms you have are not related to these problems.

As a first move, if not already done, then I would renew the diesel filter and would also check the old filter once removed to ensure that no particles are present in the filter that may suggest a failure of the high-pressure pump.

If renewing the filter makes no improvement on matters and the engine still tends to cut out under the same circumstances, I would first ask the garage to check the system fuel pressures and consider that the DPF may not be regenerating, causing back pressure in the system.

As you did kindly send the registration number of your Vauxhall, I can see that it has covered around 6-7000 miles per year for the last few years. If this was mainly used for short journeys it could be the case that the EGR valve has become clogged with carbon and is not operating correctly – this could give the symptoms you have and would also be worth checking.

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AUDI A3

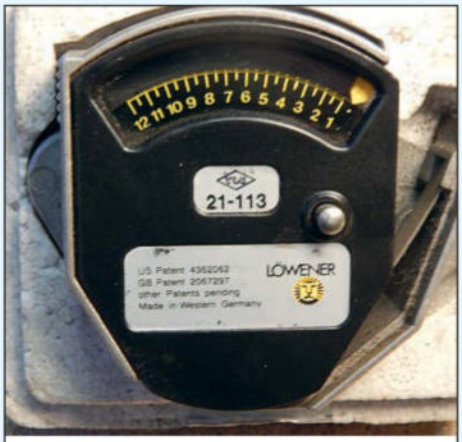
Clutch travel

Q My daughter has a 2012 Audi A3 Sport with the CRBC 2.0 diesel engine. On moving the car the other day, I noticed the travel on the clutch pedal was very short or the biting point quite low. I just wondered if you thought this would be a sign of a future problem. I thought probably if the clutch was on the way out the pedal travel would be getting higher. I am not sure if this should be of any concern.

I have a couple of other questions I would like your opinion on... I attach a picture of a timing belt tensioner tool I bought at a boot sale many years ago as it was cheap, but I have no idea what or when this tool would be necessary. I have changed a few timing belts in my time but have never had to use a tool for the belt tension. My question is when this tool would be needed/used?

My next question concerns Gunsons Colortune. I notice that these tools are now available new on eBay as well as quite a few second-hand ones. I have used this tool many times in the past on older cars with carbs and found them very good to use but I am wondering if people are finding some use for these on modern petrol cars as they seem to be selling so well.

Bill Kerr



Readers picture of the lower timing belt tensioner.

A The clutch biting point being low may be a sign that the clutch is beginning to wear, as the hydraulic operation of the clutch and the clutch cover, do adjust to compensate for wear. This would not be an immediate issue unless the pedal travel has altered of late. Some systems do just sit at this level. If the clutch biting point became so low as to be difficult to engage gear, then this could be a sign that the wear in the clutch was at a point where the clutch would require renewing.

The tool is indeed a timing belt tensioning tool, and this was patented in 1980. The patent number on the machine gives the following description: A belt-tension gauge for measuring the tension of a belt spanning a pair of wheels, especially a V-belt in the engine compartment of a motor vehicle, comprises two pivotally interconnected housing parts which are biased by a spring spread apart and carry respective rollers which bear upon one side of the belt while a member at the pivot rests against the opposite side. The relative displacement of the two housing parts by the spring is displayed by indicator on one of the housing parts and indicates belt tension.

The description of the operation of the gauge indicates that the linearly effective spring thus urges the pressure member against the belt in a manner which tends to flex the latter between the support members, the degree of such flexure being an indication of the tension on the belt which is displayed by an indicating member utilising a scale and pointer system.

But I can find no indication of the tension from the increments 1-12 on the dial, and so without this information the gauge would only be a rough guide.

The Gunsons Colortune has always been a great way to look into the running engine to ensure that the combustion process was efficient. The blue flame of a clean combustion was always a nice easy method to use when adjusting carburettors. In more modern applications it can be used to detect air leaks in the induction system that may be causing a weak mixture in one or two cylinders. If you were to use the Colortune on a modern engine, you could not make any adjustments but you could see the results of an air leak. So, if the Colortune displayed a nice bunson blue flame on one cylinder and a yellowish flame at the other end/side of the engine, then this would be an indication of the area that air may be entering the induction system.

The kits are still made and the standard 14mm plug kit retails at £63.14 including VAT.

AUDI A4

Hot start trouble

Q My father's 2007 Audi A4 2.0 TDI has done 83,000 miles and has a curious start issue. From cold or just warm it will start perfectly, but from full temperature it won't start at first turn and may take several attempts to start. It will turn over and run like it's on three cylinders – then cut-out. This can be overcome by starting and pressing the accelerator and taking the revs above 1500rpm briefly. It will then keep running and be normal.

It's had a new starter and has no fault codes. It's still on its original battery and been to a VAG specialist who didn't know the cause and said it was turning over fast enough, as being a PD engine it needs a certain rpm to run, but diagnosed the dual mass flywheel as faulty, but no assurance this will sort the actual start issue.

Is this a fault you have come across and do you have any ideas before resorting to change the flywheel?

Jonathan Jones

A This is a problem that has plagued the PD (Pumpe Düese) engine and is often difficult to diagnose. Like all common problems, the reason can be different and so where the fault may be a defective coolant sensor on one engine, on another the problem may be the tandem pump.

One of the common fixes for the hot start problem was a new starter motor. The engine when starting does need to reach a sufficient speed to ensure that the compression is high enough and a slow starter can impede this. As your specialist has checked this, I would hope that this can be discounted as a problem along with the battery performance.

In your case, the engine will start but then appears to start on only possibly three cylinders. This suggests a fuel pressure issue. This would be confirmed by the presence of smoke from the exhaust when the engine did fire-up.

The PD engine requires a constant fuel pressure which is supplied by the tandem pump at the end of the camshaft. The fuel is then fed along the gallery in the cylinder-head and into the injectors. Two problems can occur at this stage, either the seals around the injectors can leak allowing the loss of

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pressure, or they can leak allowing the fuel to drain into the cylinder.

A third problem with the injectors is that the cam lobes can wear and the injector does not get the full stroke needed to operate at the correct injection pressure.

There is also a common problem with the injector wiring loom, but I would have expected this to be checked and it would normally return a fault code.

As the vehicle has undergone such thorough inspection and I would expect that the live data has been examined to ensure that the engine sensors are reading correctly. I would ensure that the injector camshaft has not worn and that the seals on the injectors are not allowing pressure loss.

A worn DMF would create a noise and may even break up allowing debris to enter the starter and slow it down, but I would not suspect the DMF of being the cause of the poor starting.

AUDI A5

Annoying alarm

Q My son's 2012 Audi A5 Coupe 2.0 TDI CR is annoying the neighbours by going off the last couple of early mornings. I had a similar issue with my Honda Accord a few years ago and it was the alarm battery which needed changing.

Are there any checks we can do to establish the cause on the A5? If it is likely to be the alarm backup battery where is it on this car?

Dave Steele

The micro switch in the bonnet catch is a likely source of the problem.

A **One of the most common issues with the Audi alarm, is the bonnet switch incorporated into the lock, but the problem may be the internal sensor located above the rear-view mirror – or one of any number of problems that can occur in the system, including as you have suggested a low battery in the module.**

The best way to check out the problem would be using a scanner equipped with VAG software, but a quick check of the connecting plugs first may show up a poor connection. The alarm horn is located to the nearside of the vehicle in the plenum chamber below the plastic cover, and a check on this for condition and to ensure the connecting plug is clean and dry would be worthwhile.

Autodata also warns of a problem on this model which allows the door open lamp to illuminate on the control panel when the door is closed. This is connected to a problem with the door lock, and would be checking out as it may be associated with the alarm fault you have.

AUDI A6

CD coding

Q The CD multiplayer in my 2011 Audi A6 3.0 TDI recently died, and I fitted a direct replacement second-hand unit. I also replaced the battery which finally surrendered after 14 years' service. The CD player needs to be coded to the vehicle as does the battery.

My local Audi garage has quoted £342 to recode both items. This is 1 hour labour for the CD player and half hour for the battery. Is one and a half hours reasonable to recode items as it seems excessive?

How important is it to get the battery coded to the vehicle? And are there any alternatives to Audi recoding the CD player (specialists or another VAG dealership, e.g. Skoda). I suspect I'll be listening to the radio from now on. Thanks.

Martin Williamson

A **If I start first with the coding of the battery. This is important to ensure that the new battery is charged at a suitable rate. Whilst no difference in operation may be experienced at first, if the system is not coded to the new battery, this will shorten the life of the battery that has just been fitted.**

The coding of the CD multiplayer can be done with aftermarket equipment such as the Ross-Tech VCDS HEX-NET Package – this is around £625 from gendan.co.uk and also requires a suitable laptop running Windows. The software is also referred to as VAG-COM and does give dealer-level control. There is also a large support group online for users of this equipment.

Whilst this will in the short-term be more expensive than the dealer quoted figure to remedy these points (the battery and the CD). If you do intend to continue owning and maintaining VAG vehicles in the future this may be an investment.

I would add that cheaper Ross-Tech packages are available, but these have limited function in regards of the vehicle fitment. Further details can be obtained from gendan.co.uk on 01792 588002.

AUDI A6

Brake calipers

Q My A6 TDI Ultra (192/2.0) has 30K miles, and disappointingly the brake calipers are looking a little sorry for themselves. I'm intending to paint them as I have for many other cars I've had. Thing is, as you know these calipers have individual motors for the handbrake. Do I need a plug-in OBD tool to disable them, or can I merely leave the handbrake off and disconnect the battery?

Obviously, I need to take the pads out to paint the calipers. Also, can I change the pads this way when I need to, or again do I need the OBD tool to do this? Hopefully not, but in the event that I do, can you please advise which may be the best to purchase, also considering cost?

Phil Davies

A **From the data I have you would need a diagnostic scanner with VAG software to first retract the brake calipers and then to reset them. This will I believe be the case even if the battery is disconnected. Not all scanners have the capacity to reset the parking brake and you will need a tool such as the Foxwell NT530 Professional Multi-System Scan Tool for VAG Vehicles which is around £174 from this company – www.gendan.co.uk**

Autodata also warn that the battery should not be disconnected until the ignition has been turned off for ten minutes, and that the battery condition sensor multi-plug should be disconnected before reconnecting the battery earth lead. After the battery has been reconnected the sensor plug can then be reconnected. The steering position sensor will also need resetting by driving the vehicle for a short distance.

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SKODA OCTAVIA

Rear fog lights

Q I have a 2013 Skoda Octavia Mk2 1.6 TDI Estate with high mileage. My problem is: with ignition switched on and lights switched to the on position, engine NOT running, the rear foglights stay illuminated forever. However, as soon as the engine is started and running, the rear foglights goes out after about five seconds (almost as though they are on a timed relay). I have tried several ways of trying to get the rear fog lights to work properly, to no avail.

Skoda dealership are very helpful, in that they will need to charge £75 to plug in a diagnostic scanner to try to help resolve the problem. The indication light on the dash shows the foglights are illuminated.

I am a qualified (albeit retired) vehicle mechanic and have several diagnostics programmes including VCDS, but these are only showing a fault, not a fault location or how to rectify the problem. Can you advise?

Mike Mooney

A **The foglamps are controlled by the multi-function module, and given the strange nature of the faults you have I would suspect that the multi-function control module could be the source of the problems. The multi-function control module on your Skoda is incorporated into the fusebox which makes replacement a complex operation.**

For this reason the first check I would make is the headlamp switch assembly. I have known these to display strange symptoms and by removing and disconnecting the switch, this should help to narrow down the problem. If after disconnecting the switch the foglamps remain lit, then the multi-function module would seem to be the most likely culprit, but if the lights extinguish then there is a good chance that the switch itself is at fault.

SKODA FABIA

Tyre change

Q I have a 2011 Skoda Fabia estate 1.2 petrol. I am currently using snow tyres on the original 16in alloy wheels. I have a set of 14in steel wheels with summer tyres on. I wish to get one set of all season tyres. My question is should I fit the all-season tyres to the 16in wheels or the 14in rims?

George Smith

A **There are a couple of points to take into consideration and which wheel rims you decide to use will depend on these points.**

The first is the ride and comfort of the vehicle. The 14in rims with 185/60 tyres would give a slightly more cushioned ride than the 16in rims using 205/45 tyres. The profile difference will slightly reduce the handling when cornering, but this will be minimal.

The lower profile tyres to fit the 16in rims will be around £15-£20 more expensive and so this is something to be considered when purchasing a new set. On the other hand the alloy rims are normally more aesthetically pleasing and so if choosing on looks then the alloy wheels may be more desirable.

From a purely technical stance the advice given from countries that have a lot of snow and a wide experience in winter driving is that the smaller wheels with a deeper tyre give the best driving experience in snow. This would explain why most winter tyres are fitted to the smaller 14in rims whilst the summer tyres would be reserved for the larger 16in rim with the lower profile.

To conclude, as you have had the winter tyres fitted to the 16in rims and if the cost element is not an obstacle, then I would replace the winter tyres on the 16in rims with the all-weather tyres.

SKODA SUPERB

Crystal maze

Q I wonder if you might have an idea what is going on with my 2016 Skoda Superb 2.0 TDI? I was filling up my windscreen wash and noticed this build-up of white crystals and I can't figure out what it might be. I've attached a couple of photos. The car is running fine with no warnings. I would be very grateful for any suggestions.

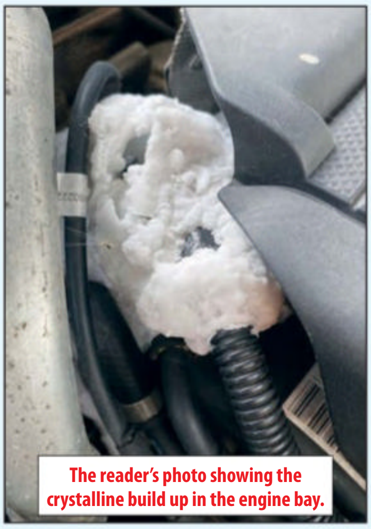
Rob Veltze

A **From the composition of the crystals and the area that they have gathered, I would suspect that this is a small leak of the SCR additive (AdBlue) used in the diesel particulate filter system.**

I would expect that if the pipe were cleaned and then inspected after a short run, the damp from the leaking additive would be visible.

This is exactly the type of crystal formation that can be seen when the AdBlue is exposed to the air, and so this is what I expect will be the source of the problem.

Whilst at this stage not an urgent matter the leak will need attending to, to ensure that the problem does not get to the stage where the AdBlue is being directed into the engine bay and not into the DPF.



The reader's photo showing the crystalline build up in the engine bay.

SKODA FABIA

Wiper operation

Q I am currently preparing a 2004 Skoda Fabia estate with the 1.9 TDI (engine code ATD) for return to the road. It's been a *CM* type project that I have been working on over the past year. A lot has been done – in fact, the car has been practically rebuilt in many respects.

There have been several niggly electrical issues and the latest to rear an ugly head is failure of the intermittent front windscreen wipe. It's a variable speed type, but it doesn't operate on any of the four timings. Fast and slow continuous wipe or the single flick wipe operate OK.

Am I likely to be looking at a faulty switch on the intermittent setting or could it be a timer relay? Any suggestions welcome.

My other question relates to the flywheel. I cannot deduce from the Haynes manual nor from any of the online motor factors what type is fitted. Could you tell me is this engine fitted with a solid flywheel or is it a dreaded dual mass one? I ask this, because

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there is 148K on the clock and would like to be forewarned as and when the current clutch has done its time.
William Bamber

A The speed of the intermittent wipers is determined by the multi-function control module from the signal received from the wiper switch. This means the failure could be in the switch or the multi-function control module, but I would suspect the switch is the most likely candidate, and it is possibly the variable resistor within the switch has failed. Checking the connection to the switch and the multi-function control module before going any further would be prudent. The multi-function control module is located under the dash and is part of the fusebox/relay plate. The wire from the intermittent control should be coloured Brown/Blue.

The details I have from Autodata and also from the workshop manual suggest that your vehicle range uses a solid flywheel and a standard clutch system, and so I would not expect a DMF to be fitted to your Skoda.

SKODA FABIA

Battery fitment

Q I have two minor queries about my 2012 Skoda Fabia 1.2 TSI with 54,000 miles which is garage kept. I have had the Fabia from new and it still has the original battery with no issues. The car does get a good run most months as the family live about 70 miles away.

I have used a CTEK charger over the years to give the battery a top up now and then. I would think that I should be looking towards a replacement battery in the near future? I do not know what the battery is fitted as all I can see is a white case with a black top with a green viewing eye on the top. What would be a suitable replacement?

Also, the wheel nut torque is given as 120Nm. Is this the same for alloy and steel wheels as I have a full-size steel spare?
Dave Fisher

VARTA
D15
SILVER Dynamic

The Varta D15 Silver Dynamic battery that would be a good option.

A Starting with the road wheel torque setting, I can confirm that this is 120Nm for both the steel and the alloy rims.

The battery with the small viewing eye is described by the VAG manual as the magic eye. The general code of the battery required is an 027, the type of battery required will depend on if your Fabia has the Stop-Start system. If your Skoda does have the Stop-Start function, then you will require an AGM battery such as the A8 VARTA SILVER DYNAMIC AGM 027 12V 60Ah (560901068). If your Fabia does not have Stop-Start, then a standard wet battery such as the D15 VARTA SILVER DYNAMIC 63Ah (563 400 061) will be sufficient.

When fitting the battery, the clamp torque setting is 20Nm and the terminals are given a 6Nm torque setting.

There is also a process to reset the one-touch window operation which is as follows:

- **Ensure all windows are open and all doors are fully closed.**
- **Manually lock the vehicle using the key in driver's door. Turn and hold the key in the lock position until all windows are fully closed, then release key.**
- **Turn and hold the key in the lock position for at least three seconds. The system should now operate correctly.**

SKODA ROOMSTER

Steering light

Q The steering light on my 2008 Skoda Roomster 1.4 TDI (5J7) started illuminating occasionally a few months ago. Sometimes just turning-off the ignition and turning-on again cleared it. Sometimes when the light came on, the steering was heavy when manoeuvring. This has now progressed to the light being on almost permanently but turning the ignition on/off occasionally will work but when it doesn't the steering is heavy when manoeuvring.

The fault codes I was getting were 00816 and 01317. I tried to clear them but 00816 wouldn't clear. I then ran an active test with the results as per the attachment and then, although I still had fault code 00816, it gave a different description of the fault. I have check pump connections, fuses, battery, etc., and could not see any problems on that score.

Looking at various websites it appears opinions are split between whether to replace the pump or the steering sensor. My own feeling is that I should replace the sensor first, if for no other reason than the cost of a pump but would be grateful for your thoughts.

003-3 Pump Motor, Status	ON
003-4 Steering Aid, Sensor (G250)	Yes
004-3 Steer. Aid Sensor, Reference Voltage	Too Low
004-4 Voltage (Terminal 15)	14.50V
001-1 Voltage (Terminal 30)	14.50V
001-2 Pump Motor, Voltage	5.0A
001-4 Pump Motor, Status	ON
002-1 Steer. Aid Sensor, Angular Velocity	0.0°/s
002-2 Pump Motor Speed (specified)	1254/min
002-3 Pump Motor Speed (actual)	1254/min
002-4 Pump Motor, Voltage	5.0A

Does the fact that the pump is running at the specified speed indicate the pump is OK? For your information, I fitted a new steering rack five years ago.
Roger Harrison

A The code 00816 refers to the power steering sensor (G250) and the same code can give a different description of the problem. The variations are Power Steering Sensor (G250): Short to Ground, Power Steering Sensor (G250): Open or Short to Plus and Power Steering Sensor (G250): Faulty.

The common denominator is though the sensor and the two most probably causes of the fault are either a fault in the wiring or the connections between the control unit and sensor, or the sensor itself.

The second code 01317 Control Module in Instrument Cluster (J285) - sporadic – No communication, would back-up the theory that the fault may be in the wiring loom or connection.

Given the 00816 code is the sticky one I would first check through the wiring and clean the connections to the steering sensor and the pump. As you have already done, this I would agree with you that the problem you have and the code reappearing I would replace the sensor. The part number for this should be 6Q0 423 445.

While the fault could still be with the pump, the sensors do have problems and this would be the most likely cause of the troubles you are having.

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VOLKSWAGEN EOS

Metal flakes in oil

Q Sorry in advance for the long email, but I'm hoping more background info might help with a diagnosis. Summary of the issue: My vehicle is a 2007 VW EOS with the 2.0 TFSI (BWA) engine and a six-speed manual gearbox (JLW). It has covered 60,000 miles and does around 1500 miles a year.

I did an oil and filter change this weekend as part of my annual service regime and on a whim cut open the oil filter to inspect it and found some metal specks, about the size of a grain of sand and brass/copper in colour. See pics for reference. I tested these with a magnet and found them not be magnetic. The filter didn't seem to be clogged with these specks and they all seemed to be the same size but can be seen in most the pleats of the filter material.

I have cut open the oil filter a few times over the last six years, and not seen anything in the pleats of the filter material before, ie. no metal fragments, if anything it looked text book perfect. But it must be at least a couple of years since I last did this check.

The car has a run of approx. 25 mins including high speed motorway miles each week if it's not been used (most weeks in the winter). This run does include high rpm work (approx. 5000rpm, but never up to the redline), but only when the car has warmed up thoroughly. For example, when entering the motorway, wide open throttle is used, going up to approx. 5000rpm. The car has never been over revved, ie. selected the wrong gear.

The oil level is always checked weekly and has never run low as it's been topped up as needed. Given the mileage we cover, its minimal amounts and I haven't noticed any change in oil usage.

The VW has a full service history with an annual service including an oil and filter change. Good quality oil and filter are used each time (Castrol Edge and Bosch filter).

A high-quality fuel system cleaner is used once per year (Techron) and Castrol oil flush every couple of years.

Emission tests has also been perfect and there were no advisories at the last MOT.

After the oil and filter change, I did a test run and all was fine, the car warmed up as expected, no evidence/didn't notice any blue smoke. No strange noises at all, and idle is perfect. All in all, given its 2007 car, it feels and runs as new. I did keep the revs low, up to approx. 2.5k on this run. After sitting for 20 mins after the run, engine off, the oil was checked and all was fine, level, colour and no evidence of metal specs seen on the oil dipstick. No coolant has been used.

I have access to a driveway, a fairly comprehensive toolkit, VCDS and ELsaWin service manual. The car can be off the road for as long as needed, as we have access to another car.

What next/testing/inspection/other ideas? I did some research, which gave a right mixed bag of opinions, but boiled down to two main routes. The first being 'end of world' and I need a new engine, ie. damage is done, so full rebuild is needed. Given the above I hope this isn't needed.

The second, which would be a more conservative approach and centred three things to start with.

Firstly, use an oil pressure gauge kit to a do pressure test. Secondly do a compression test, and thirdly drive approx. 50 miles, low revs/stress and do another oil and filter change and check the filter again.

In essence try and get a baseline/health check for the engine. Next steps would depend on the values from the tests.

Do you agree with this second approach? Any suggestions or advise welcome. If you agree, I've done a compression test before and have the kit, so happy on that front. I've not got an oil pressure kit (machine mart – Clarke CHT712 oil pressure kit, £45.59, or something along these lines). Can you advise how to undertake the test?

The car is in for its MOT tomorrow, so I will see what the outcome is before progressing. I will send a pic with this email, and a few follow up emails, as the pics are quite large in size but needed to pick out the detail. If you need any more info please ask.

Rob Slate

A The first comment I will make, is that the filter has done its job and collected the small particles, and this should be reassuring. I would disagree with the first possible scenario and totally agree with the second approach and would add a note of the draining of the engine oil. The drain bung threads are known to wear on this engine, if you have not fitted a new drain bung at the previous oil changes, then this should be renewed. It is possible that the tiny fragments you have found are actually from the drain bung, although in this case I would expect them to be magnetic.

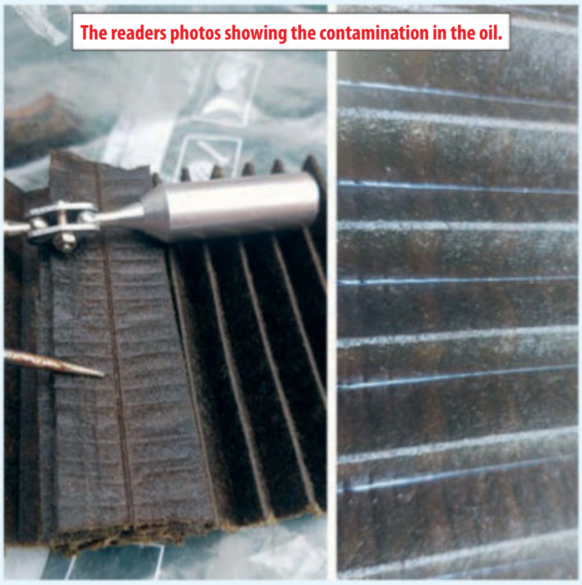
Other possible sources are that the particles have come from the oil pump timing chain or drive sprocket, or balance shaft gears.

Further sources are the big end or conrod bearing or even the valve gear or rear timing chain camshaft drive gear.

When you actually consider the number of contact points in the engine, the tiny fragments become less alarming, and as mentioned this is what the oil filter is in place for.

Other than checking the oil pressure to ensure it is between the given parameters of 2.7-4.5 Bar at 2000rpm, and does not exceed 7 Bar above this rev range, then at this stage I would not be concerned. The oil pressure test is quite simple and involves the removal of the oil pressure switch, to then allow the gauge adapter to be screwed into place.

Wear will of course always take place when metal objects come into contact, and the job of the lubricant is to ensure that this is minimal, the filter should then ensure that any particles do not continue to circulate as this is where the damage may occur.


The readers photos showing the contamination in the oil.

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VOLKSWAGEN GOLF

Sudden stop

Q I need some help with my 2007 VW Golf Mk5 – its 1.9 diesel with 168,000 miles. The problem I am having is that mainly on the motorway, doing 60-70mph car just stops. No indication whatsoever of there being any problem. What happens – no warning lights, no nothing, just suddenly lose power, car comes to a stop.

Fortunately for me I have been able to get to the hard shoulder and keep safe. This has happened several times now, over a period of time. After approximately 3-5 minutes after the car has stopped working, I have managed to get the engine going again, and able to get to my destination.

This is now causing a great concern. Approx one year ago, the fuel pump was replaced, and fuel filter recently renewed. I took the car to have its diagnostics checks, they found no errors on their system. They even took the car for a drive, no issues found.

Can you please help/advice, as to what might be causing the issues I am having with my Golf.

Sanj Patel

A I can fully understand how alarming this must be, and it is confusing with no codes left in the system. I would suspect that if it was possible to read the codes at the time of the breakdown then this would reveal the source of the problem. Looking at the situation as this is a PD engine, the injection system could cause this type of problem if the electronic control were to fail. I would not initially suspect the low-pressure or high-pressure fuel pumps, as if one of these were to fail it would normally leave a low-pressure code in the system and I would not expect the engine to restart so easily after a short wait.

This leaves two possible areas that I would carefully inspect – the first is the injector loom within the cylinder-head cover. This is subject to the heat of the oil and these do regularly fail when hot, although this is normally manifested in the form of a misfire and not a total loss of power.

Also check the engine external wiring loom paying close attention to the crankshaft sensor connection. It may be that a connection is failing when the loom warms up, and again once cooled this may then restore the poor connection hiding it when inspected.

One other action that I would carry out as a matter of course is to replace the crankshaft sensor – the symptoms of failing when hot, then restarting after cooling down do match the possible failure of the crankshaft sensor, and this can certainly fail in this way without leaving a code.

VOLKSWAGEN GOLF

Battery question

Q I have a 2014 VW Golf Mk7 1.6 TDI with DSG gearbox. The mileage is approx. 73K. Thanks for your previous help with engine cooling fan query as below. However, the fan issue prompted me to be watchful of the battery condition. Since returned from the fan/electrics checks below (about 30 miles), the vehicle has been garaged for 15 days and only done one further journey of about 28 miles. As we go away for a short holiday next week, I checked the battery with tester and it read only fair (12.0 volts) so then connected it to my RING RSC806 6A Smart Charger/Conditioner. With no electrical usage, I would have expected the battery to have retained a better charge even in cooler winter temps – it is in a normal 'attached' domestic garage and NOT outside.

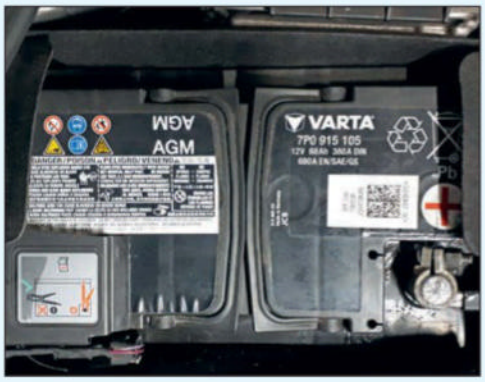
Please see the attached photo of my battery. I am familiar with most battery terminology, but this VARTA has unfamiliar coding. I can deduce its rating is 68Ah but does the 680A relate to CCA? And is it 096 type?

From looking on Halfords website using registration number, they specify two variants of an AGM 096 battery (4 or 5 years warranty). Both are 70Ah, with 720A CCA, and 360,000 starts, and specified for my Golf. Therefore, is my VARTA 68Ah battery correct (and just elderly like me) but with less capable tech than the new generation of 70Ah units.

I don't want to suffer a winter breakdown, OR waste money, but maybe a previous owner bought a less capable battery to save cash and its performance has degraded? Though my car has Stop-Start among many other 'BlueMotion Tech' systems, I hate Stop-Start and never use it. After six hours charging, the RING unit is displaying 14.8 volts 'FULL.'

Thanks again Steve. Your observations would be most appreciated.

Keith King



A The battery fitted is rated at 68Ah and the CCA is 680A, the other rating is the DIN rating – this is carried out at -18°C. The fully-charged battery is discharged to 6V with the rated test current. The specifications of the 096 battery can vary and I suspect at the time this was fitted it was the correct fitment.

The battery recommended for your vehicle by Varta is the Silver Dynamic AGM 570 901 076. This battery has a capacity of 70Ah and a CCA (cold cranking amps) of 760A. The UK Code for this battery is 096AGM.

The AGM indicates it is an AGM battery ("AGM" stands for "Absorbent Glass Mat", because the electrolyte is bound in an absorbent glass fleece).

These are powerful batteries for automatic Start-Stop systems and have very good cold start characteristics. Thanks to the cycle stability of an AGM battery, a warm engine can be switched off and started again several times at short intervals, without the risk of difficulties when restarting. They also provide sufficient reserves to continue to supply electrical consumers during the frequent stops and still guarantee reliable starting.

In conclusion I would suspect that the battery is aging and may have calcified allowing the discharge you have experienced. You may find that now you have charged it with the smart charger/conditioner, that it may be a little more stable, but if the voltage does drop, then a new battery may be needed.

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VOLKSWAGEN POLO

Bonnet open switch

Q My son visited me and hired a 1.0-litre 3-cylinder Volkswagen Polo. He opened the bonnet to check the oil, but upon setting off, the windscreen wipers wouldn't work. The AA came out and shut the bonnet two or three times – then the wipers worked.

Is this common on newer VW's? There is no 'bonnet open' light fitted. It does seem a strange idea for the wiper to be affected by this.

Brian Hunt

A In my experience most VW vehicles do have this feature, and have had it for a while. From a workshop's point of view it can be frustrating to have to ensure the bonnet is down and fully closed when checking the washers and wipers.

I believe the feature is built into all the VW range. I can only assume that on some of the vehicles the wipers run at a close proximity to the open bonnet, and if operated with the bonnet open, they may therefore collide with the bonnet.

There is no tell-tail light fitted for the open bonnet, but as you have pointed out, this would be beneficial.

VOLKSWAGEN TOURAN

Interior lights

Q I have a 2012 VW Touran 2.0 diesel and one of the interior blubs blew so I got a LED alternative to replace it but changing it had the effect of losing all. No where can I find a fuse finder to see if that is the problem. Even asking a well-known roadside recovery service technician couldn't help.

Paul Dobing

A The interior lamps on your Volkswagen are controlled by the multi-function module situated to the right of the steering wheel behind the dash. The fitting of the LED bulb will have disturbed the voltage detection, and this would possibly explain the loss of all the interior lights.

The multifunction module takes feeds from fuses number, 4, 16, 23, 26, 45, 46, 47, 48, 52. It would be worth checking these fuses but I would suspect that the problem is more to do with the LED bulb now in the circuit. Checking using a scanner equipped with VW software should give a better indication.

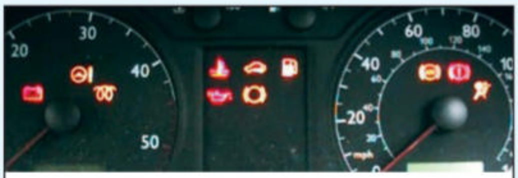
VOLKSWAGEN POLO

Engine management light

Q I have a 2003 VW Polo 1.9 SDI which was in storage until recently. With battery charged it started remarkably easy. I notice now that the MIL light doesn't come on during the ignition sequence. I have checked all relays and fuses which all seem OK. There is power at the OBD plug and it will recognise a scanner when connected. As I intend to MOT this car it will be an automatic failure if this light is non-functional. Are there any known causes/fixes that you've heard of?

I really cannot think of anyone else to ask as moving it without tax, MOT or insurance is not an option. Any help would be greatly appreciated.

Martin Duffy



The dash warning lights that will appear on the Polo.

A From the details I have the 1.9 diesel version of the 2003 VW Polo did not have a separate EML (the engine-shaped lamp). This function was covered by the glow plug warning light (the pigs' tails curly symbol).

This would explain why you cannot see it – and as the diagnostic connector is working correctly and is allowing a scanner to be connected, it would be possible to confirm this by checking the live data for the management light operation.

The MOT tester should be aware of this and will not fail the vehicle provided the glow plug light does illuminate and extinguish.

I have added a photo from the dash of a similar 2003 VW Polo diesel showing the lights that should illuminate when the ignition is first turned on.

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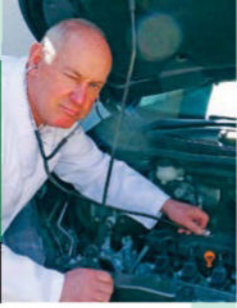
Diagnostics Doctor



Steve Rothwell answering your **ENGINE MANAGEMENT** queries

GENERAL

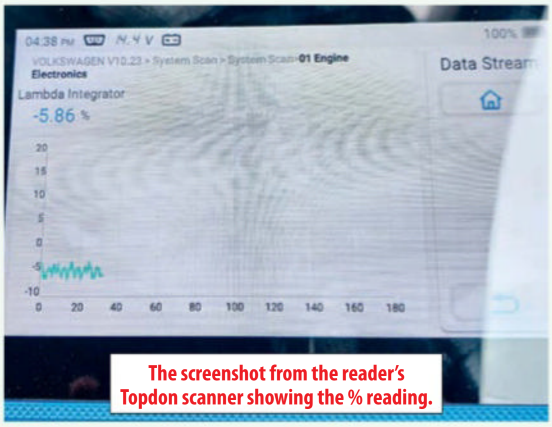
Topdon scanner

Q I have recently purchased a Topdon Artidiag600s scanner. I have been trying to see if there a way of reading voltage readings for various sensors, i.e. Lambda sensors, Coolant Temperature Sensor, etc.?

When I try to read live data, it looks for me to input a channel, as opposed to just showing me the different sensors available to check. Screenshot is attached.

For example, I wanted to read the live data off my VW Polo (03d15097). However, the closest thing I could find was a Lambda integration reading, which appeared be in % values, as opposed to a voltage reading which is what I was hoping for. Any guidance would be much appreciated.

Colin Devereux



VOLKSWAGEN V10.23 > System Scan > System Scan>01 Engine Electronics

Lambda Integrator

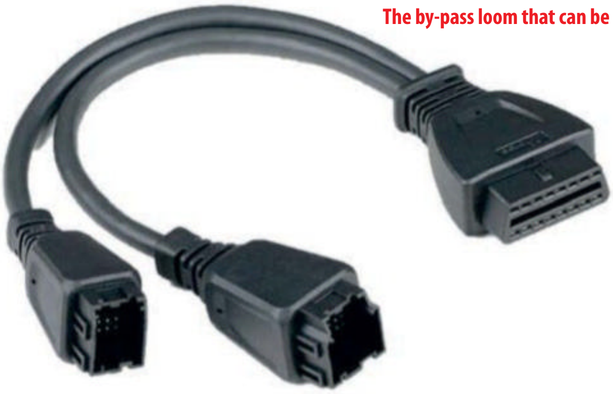
-5.86 %

The screenshot from the reader's Topdon scanner showing the % reading.

A **Most scanners will only display the live data in terms of the information the sensor is supposed to be relaying to the control unit, so a temperature sensor will be displayed in the format of the temperature reading and a Lambda sensor will be displayed in the % value of operation. In a similar manner the throttle position will always be displayed in the % of operation. I am not sure if the TOPDON Artidiag600s scanner can be set to show the voltage readings, but I would not expect this to be possible. Support for UK purchased units can be found at https://bit.ly/CMXtTDS and I am sure that if this is possible they will be able to help.**

FIAT 500

SWG by-pass



The by-pass loom that can be supplied by Gendan.

Q I need some information on the SWG By-Pass. I have a 2018 Fiat 500L and have found out that I cannot reset the service schedule due to the car having a CAN restriction installed. The message on the screen, reads 'service voucher expired'. The service mileage at this moment is 5233 decreasing as the car is used – the orange spanner is showing on the bottom right of the screen. The Fiat is serviced every year.

As you know the SWG By-Pass is to stop any access to diagnostic. I have a Topdon Artidiag 500 scanner that will access via the onboard diagnostic plug, and bring up info, but will not let me access 'service reset'.

Have been in touch with Gendan, I spoke to a chap who was very helpful and decided to go with permanent bypass adaptors – a case of unplugging both plugs for bypass module and inserting the bypass plugs. The plugs have ends to suit the entry to module at one end and the other end to suit original plugs. They recommended this way to save having to keep unplugging and reattaching.

The car has only done 15,200 miles since new and is like new, so I don't see me changing anytime soon.

I have tried to reset as per videos on YouTube but no use, i.e. turn on ignition, press accelerator three times within so many seconds.

Only problem, can't find the module. Supposed to be either under dash close to steering column, or under passenger side, but there is no sign of it. I know what it looks like, but no luck.

I read an article saying that it is connected between diagnostic plug and the radio. If this is the case, it must be behind the radio centre console.

I have also read that all cars may not have this installed, but as stated earlier I can't access, so it must be installed.

Chap at Gendan did say my car will have this installed. My question is where the h*** is it? Many on Fiat forums are having the same problem. Hope you can help pinpoint this item.

Raymond Dullick

A **Fiat started fitting the SGW (security gate way) By-Pass around March 2018 and this was also fitted to Alfa Romeo and Chrysler vehicles. The codes as you have discovered can be read but cannot be cleared with the by-pass in place. There are several methods that can be used, and some diagnostic equipment manufacturers do have a subscription service that allows full access to the system.**

The SGW By-Pass is located on the steering column near the base of the cowling and is normally just about accessible by reaching up through the area at the base of the cowling above the lower dash. It is a black box with two connectors, a 12-pin and an 8-pin. Gendan do supply the bypass wiring harness for £24.95 including free delivery.

I should also note that later Fiat vehicles have a Security Gateway (SGW) built into the system in such a manner that prevents a SGW By-Pass devices being used, as they do not have the black box. In this case only dealers or independent garages with the necessary subscription can effectively reset the service indicator or clear codes.

The method of resetting the service light that I suspect you have seen is as follows:

- **Enter the vehicle and ensure the doors are closed, then turn on the ignition but do not start the engine.**
- **Fully depress and release the accelerator pedal three times in quick succession. The service light should extinguish, and you should then start the engine.**

As you have discovered this will not work for your model.

⇨

FORD TRANSIT

Engine fault light

The fuel rail pressure sensor part number BK2Q9D280AB which is available separately from the fuel rail.

Q We have a 2013 Ford Transit 2.2 Custom Minibus with 110K on the clock. Went to Tattershall in Lincolnshire last weekend and on the way back had the dreaded MIL light come on with engine fault service now flashing intermittently. It made it home, next day putting the code reader on I got a code P0001 – a good search found a broken wire to the left side of the injector pump.

Visit to spare parts store, no replacement plug is available and a backlog of orders on fuel rail and the sensor on the injector pump, The Haynes manual claims that the sensor in the fuel rail cannot be removed, and yet on the internet these sensors are sold as pairs without the rail.

Do you know of a rail conversion kit or engineering firm that do this work, as I would like to replace the sensors to be sure that there won't be a problem in the future? Thanks.
Mauice Couzens

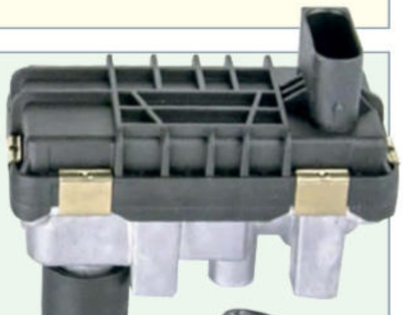
A The part number from Ford is BK2Q9D280AB which is the Fuel Rail Pressure Sensor, and this does come complete with the sensor attached to the fuel rail. But this is screwed into the end of the fuel rail and the thread should allow this to be removed separately.

This should need no conversion, and the original rail is threaded and will accommodate the new individual sensor that is readily available.

The sensors are as you have discovered readily available from several websites, and It should be possible to unscrew the sensor from the fuel rail and to then fit the new one in place.

JAGUAR X-TYPE

Glow plug warning light



The turbo wastegate actuator which may be at the heart of the problem.

Q I have the glow plug warning light coming on infrequently on my 2005 Jaguar X-TYPE 2.0 diesel. This stays on until the engine is switched off. The problem is intermittent and can occur at idle, when starting hot or cold, changing gear and increasing the revs causes the same condition. I had a rear wheel hub bearing replaced and asked the garage to carry out a diagnostic check whilst the car was there. The error codes logged were P1000, P132B (which were listed twice).

Can you please add any comments and findings as to what I should consider doing to resolve the faults as per codes listed. I have used a PR priority EGR valve cleaner, not sure if the faults may be related to the turbo.
Chris Toomer

A The code of P1000 is showing that the test is not complete and that all codes have not been fully read from the system. This is not showing a particular fault and if only this code shows it can be left.

The code P132B is the relevant code and is indicating a problem within the turbocharger boost pressure control system. This can be a faulty boost control solenoid or the turbo wastegate actuator. It can also be due to a poor circuit or failing connection in the system, and because you do also have the P1000 code this would be the point to start.

I would check the connections on the multiplugs to the ECU ensuring that they are perfectly clean and free from any contamination and the connections to the various sensors from the engine loom. I would also inspect the engine loom for any damage.

If after all these checks, nothing is found and the situation is not resolved, I would then check the operation of the wastegate actuator on the turbo, this would be the most likely area of the problem.

MITSUBISHI MIRAGE

EOBD connector

Q I have just tried to connect my fault code reader to my 2020 Mitsubishi Mirage 3 with the 1.2 petrol engine, and the socket is too small and wrong shape to take the connector (OBD2). On looking inside, the socket I cannot see any holes for pins or anything else apart from a piece of shiny metal and a bit of black plastic on two of the sides. Does this need an adapter, or is it a Mitsubishi only design?

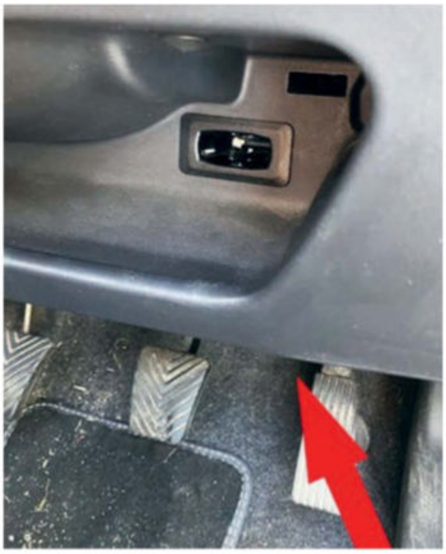
This problem only came to light because the MOT guy wanted to do the emissions test via the OBD socket and had to revert to the tailpipe test. Thanking you in advance.
Richard Midgley

A The details I have indicate that your Mitsubishi should have the standard EOBD socket located under the panel to the right of the steering wheel, down towards the base of the dash. It is a requirement under the European Directive 98/69/EC to have the standard EOBD diagnostic socket.

It may be that there is a cover over the socket that is not immediately apparent but there certainly should be an EOBD port on your vehicle.

The reader then sent in a picture…
Thank you for sending in the picture. This slot is to place the key in when the keyless operation fails, and is not the OBDII port, please see attached image from the manual.

The OBDII port should be under the panel and possibly pointing downwards but should be visible by looking up under the dash in the area I have indicated with the arrow.



The socket which the owner perceived to be the OBD port but is the key fob port – the area of the OBD port is shown by the arrow.

VAUXHALL ASTRA

Hesitation

The injectors may be the source of the hesitation and would be worth checking.

Q Many thanks for all your help in the past but my poor old 1993 Vauxhall Astra 1.6 petrol is still plagued with the mystery hesitation mentioned in previous emails for the last few years now.

Since then, the head gasket was replaced, the head skimmed, and one inlet guide replaced. At the suggestion of my excellent mechanic Forte injection cleaner was used and taken on a long run. This reduced the hesitation but didn't cure it.

The odd thing is it varies from one start to another as if there is a loose or poor connection. I've disconnected and reconnected all those I can see but no change. It only happens when the car is moving at slow speed, and the rev counter is showing around 1800 revs.

According to a description of the GM Multec system there is a Hall-Effect sensor either on the gearbox or the speedo. The speedo is cable driven and is a 5-speed manual. Could this be a clue?

Also, in a previous email you mentioned the idle control valve as a possible reason. I thought that only controlled idling when the load changed, headlamps on, etc. I'm anxious to find an answer as I fear for the engine mountings and exhaust system. As it is I dip the clutch, which we both know is bad practice! Many thanks for help.

Ronnie Mapes

A **If I start with the idle valve explanation – this is intended to control the engine speed at idle, but the possibility is that if it is faulty the air bypass that is created by the idle valve would influence the running of the engine throughout the range. If this has not been checked, then I would still consider this a possible reason for the problems you have.**

Another point to consider which I can see I have not mentioned before is that your Astra should be fitted with the octane adjustment plug at the rear nearside of the engine bay close to the coolant expansion tank. These plugs are normally not disturbed and can sit there quietly corroding.

If this is the case, I would make a quick check of the connecting plug and the terminals to ensure that a high resistance in this area is not causing any problems.

Having covered these points and if not also done so, I would check that the engine control module is clean and dry and the terminals on the connecting plug are in good condition. This is located just in front of the A-post in the driver's footwell and can be subject to damp if the interior of the vehicle has carpets which may have been host to wet feet allowing the moisture to then rise up behind the footwell trim.

I would not expect the speed sensor to give the symptoms you have as this would give different symptoms.

It is difficult to fully understand the hesitation without experiencing it, but if this is a misfire type hesitation as opposed to what would be considered a flat spot, then I would possibly consider that the injectors are checked or replaced.

These can give the symptoms you have and given that the Forte treatment did appear to make a difference then this may be relevant and given the work already carried out this would certainly be worth considering.

VOLKSWAGEN GOLF

Traction control light

Q On my 2009 VW Golf Mk6, the ABS and Traction Control lights are flashing. I've used a code reader and found the faults 01516 - Terminal 30; Left - 011 - Open Circuit – Intermittent. And 01130 - ABS Operation 008 - Implausible Signal. Any help please?

Mo Thomas

A **The code 01130 ABS Operation - Signal outside range of tolerance, and the code 01516 is indicating an open circuit. This on your Golf is often due to a fuse failure and the first area to check is the fuse for the BCM which is located within the interior fuse panel.**

There was an incident of the fuse melting due to a problem with the body control module, and the first check will be to ensure that this is not the source of the problem.

If the fuse is in good condition and no faults can be found in the fuse panel, then the next step would be to check for the connections on the BCM, ABS and ECM.

The codes are showing a communication fault, and the most likely area would be a poor connection. If nothing can be found by physical inspection, then sending the ABS module for testing would be the next best step.

Diagnostics Doctor

Diagnostics Doctor is a **FREE** helpline service for *CM* readers – including trade readers – who are struggling with diagnostic/engine management related faults.

Steve Rothwell will answer all your queries. He will need as much detail as possible: **MAKE, MODEL, YEAR, ENGINE CODE** and **NUMBERPLATE** of your vehicle – and the type of management system installed. Obviously, Steve will not be able to assess the vehicle up close, so his answer will be on the basis solely of your description. This is a FREE service and it may take some time to respond to certain problems. If you would like to receive a personal response via post, please enclose an SAE.

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cmdiagnostics@yahoo.co.uk

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CAR MECHANICS,
KELSEY MEDIA,
THE GRANARY, DOWNS COURT,
YALDING HILL, YALDING,
KENT ME18 6AL

Common abbreviations

ATS	Air Temperature Sensor
AFM	Air-Flow Meter – not a MAF type (see below). It could be, for example, a vane type
CAS	Crank Angle Sensor
CPS	Crank Position Sensor
CTS	Coolant Temperature Sensor
ECT	Engine Coolant Temperature
ECM	Electronic Control Module
ECU	Electronic Control Unit
EGR	Exhaust Gas Recirculation – meters exhaust gas back to the intake manifold
EML	Engine Management Light
EMS	Engine Management System
EPC	Electronic Power Control
EVAP	Evaporative Emissions Control System
FCR	Fault Code Reader
HT	High Tension – ignition output to the spark plugs
IAV	Idle Air Valve
ISCV	Idle Speed Control Valve – usually operated by a motor controlled by the ECU
LOS	Limited Operating Strategy – if the ECU detects a malfunction, it runs a programme to allow the car to still go, but at reduced efficiency
MAF	Mass Air-Flow meter
MAP	Manifold Air Pressure
MIL	Malfunction Indicator Lamp
PCV	Positive Crankcase Ventilation – takes crankcase gases and recycles back to the inlet system
TBPS	Turbo Boost Pressure Sensor – used by the ECU to regulate turbo output
TPS	Throttle Position Sensor
VSS	Vehicle Speed Sensor
WOT	Wide Open Throttle

Electronic Diagnostics

SKODA FABIA 1.2 TSI

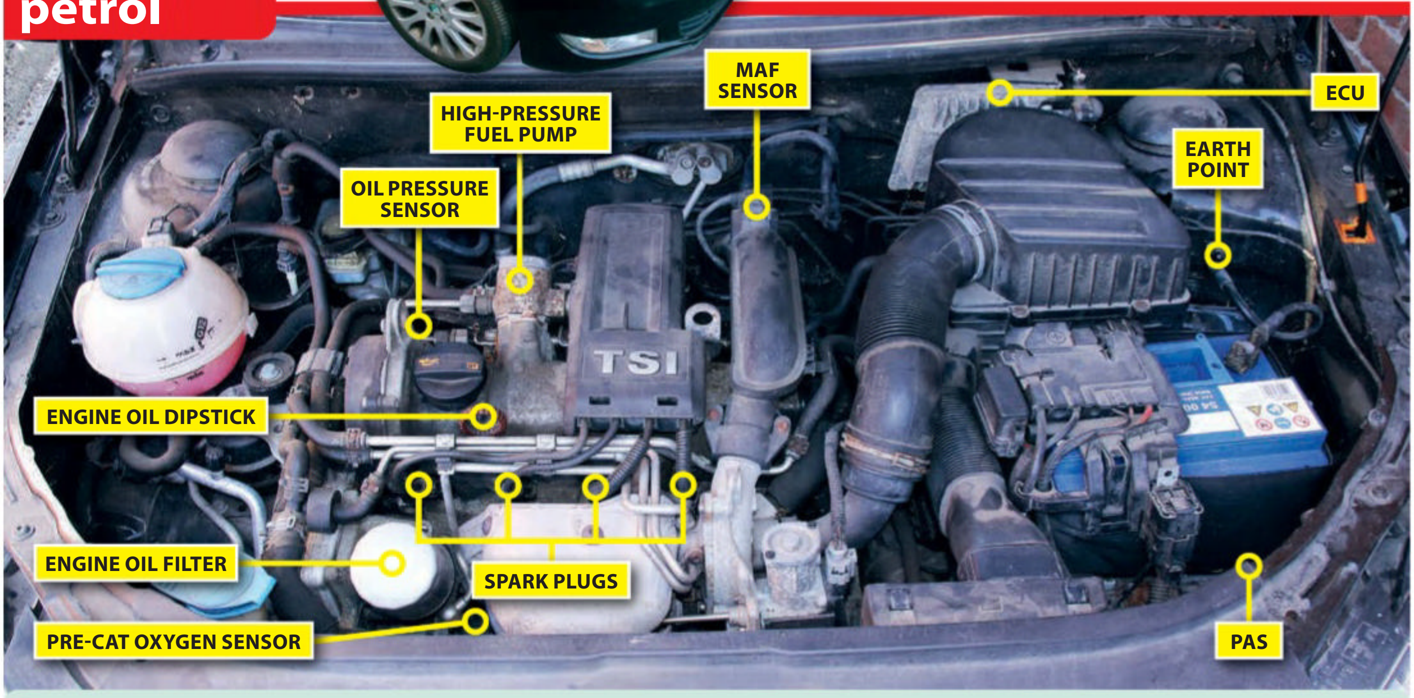
Tracing and fixing faults in electronic engine management systems

Rob Hawkins looks at the diagnostic technology behind the 4-cylinder TSI engine installed in the Skoda Fabia and discovers some of the common problems that can arise with it.

VAG's turbocharged stratified injection (TSI) range of engines includes a 4-cylinder petrol that's installed in the 2012 Skoda Fabia seen here, but it is also fitted in several other models ranging from the VW Polo to the SEAT Ibiza.

This particular engine employs a timing chain, whereas later engines have a timing belt. And some 1.2 engines only have three cylinders, so it's easy to get mixed up. The engine code (CBZB in this case) helps to make sure you have the right one.

1197cc 4-cylinder petrol



TECHNICAL SPECIFICATIONS

Engine	1197cc 4-cylinder single overhead cam turbocharged petrol
Engine code	CBZB
Engine oil grade	5W-30 to 10W-40, depending on climate
Oil classification	VW 501.01 or 502.00, plus VW LongLife 503.00 or 504.00
Oil capacity/schedule	3.6-3.9 litres with filter every 12,000 miles or 12 months
Coolant	G12++
Cooling system total capacity	7.7 litres
Brake fluid	DOT 4
Power steering	Pentosin CHF 11S/202 (0.8 litres)

TORQUE SETTINGS

Sump drain plug	**30**Nm
Oil filter	**20**Nm
Oxygen sensor	**50**Nm
Crankshaft position (CKP) **sensor**	**5**Nm
Camshaft position (CMP) **sensor**	**10**Nm
Knock sensor	**20**Nm
Spark plugs	**25**Nm
Road wheels	**120**Nm

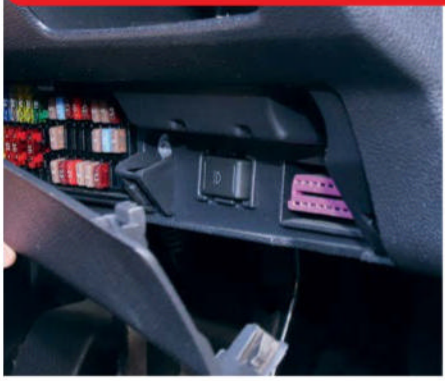
Typical of any popular engine that's found in so many makes and models, problems inevitably emerge and can seem to affect every example, but we generally only hear about the bad ones and not the vehicles that run trouble-free. A stretched timing chain is one of those problems, sometimes caused by fuelling issues, which can result in numerous disasters.

However, our local garage, MJ Motors attempted to destroy such an engine in a scrap SEAT Ibiza, running it at maximum rpm and diluting the oil to re-create some common faults. They were shocked by how robust the engine was, seemingly refusing to fail.

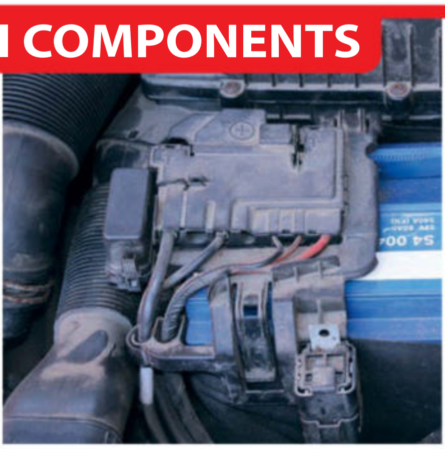
Whatever the opinion on this engine, it's straightforward to service with easy access to the spark plugs, oil filter and air filter. Yet as we discovered through Diagnose Dan's Technical Support Base (TSB), things can go horribly wrong if the oil filter isn't correctly replaced (see *Fault 6* for more details).

Our photos are mainly of the Skoda Fabia, but with access to a part-dismantled Ibiza with the same engine, we had a closer view of some of the components that are related to the vehicle's diagnostics.

SKODA FABIA 1.2 TSI COMPONENTS



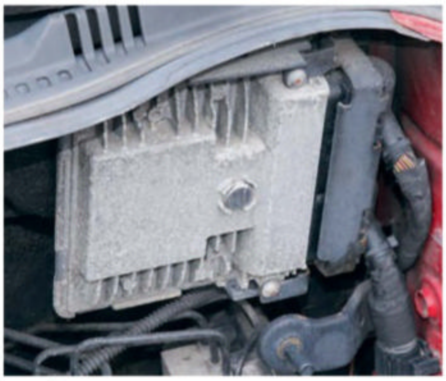
1 **The port for connecting diagnostic equipment can be found behind an oblong-shaped plastic panel below the steering wheel. Release the panel (it's clipped in position) to reveal several fuses and a purple-coloured diagnostic port.**



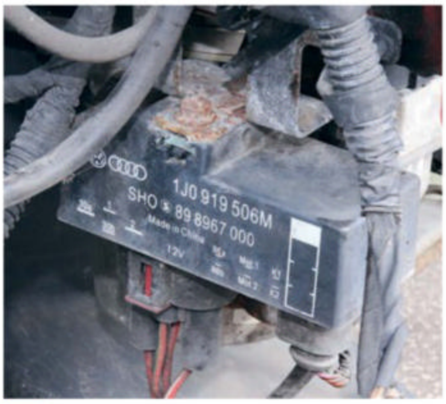
2 **From within the engine bay, the 12V vehicle battery is in the nearside front corner. It's worthwhile connecting a support pack to it to help reduce the risk of voltage drops and anomalies when diagnosing faults with the ignition switched on.**

3 **There are several earth points that should be inspected, especially if there are any electrical issues with the vehicle. There's a short earth cable between the negative terminal on the vehicle battery and the nearside inner wing. Check the cable is securely fitted and in good condition, along with the bodywork it's attached to.**

4 **On the opposite side of the engine bay, there's another earth cable, which is routed between the engine and the offside inner wing. Check this is intact and secure. There may be more earth points attached to the inner wings, which should also be inspected.**



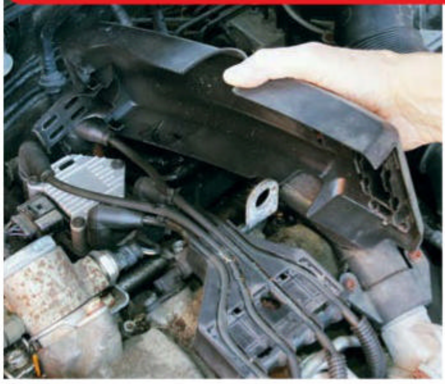
5 **The ECU is located at the back of the engine bay, attached to the nearside of the bulkhead. It's concealed by the air filter housing and risks getting knocked when changing the air filter and undoing the Torx T20 screws for the housing's lid, so make sure it's secure – ours was loose.**



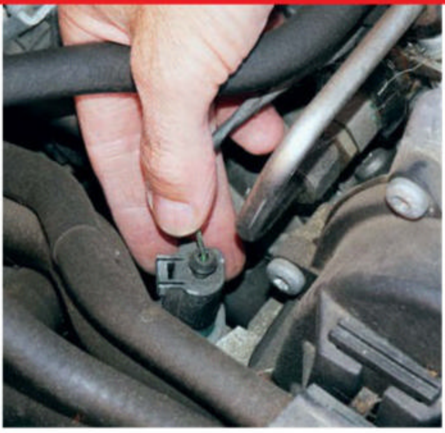
6 **Tucked down inside the nearside front area of the engine bay, there's the control unit for the cooling fan, which consists of relay switches. If the electric cooling fan is permanently on or operates erratically, there may be issues with this control unit.**

7 **◀▶ The power steering consists of a hydraulic system, but with an electric motor to pump the fluid to the steering rack instead of a belt-driven unit. Only the top of the reservoir can be seen from inside the nearside front corner of the engine bay (look for a green cap), but below this, there's a reservoir and motor. Water ingress can cause issues with the electrical components.**

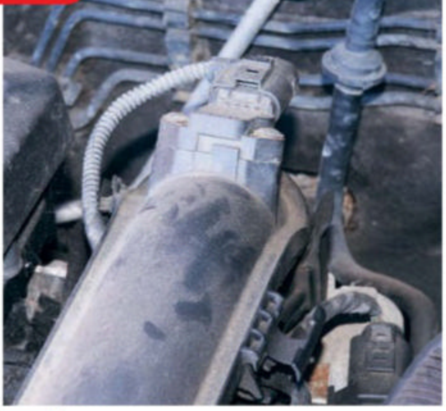
SKODA FABIA 1.2 TSI COMPONENTS CONTINUED



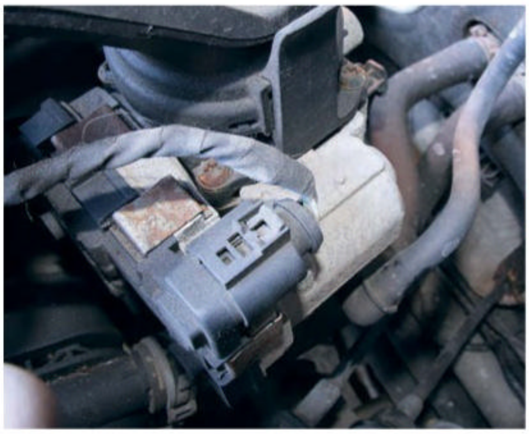
8 Removing the small TSI-labelled plastic cover (it's clipped in position) reveals the coil pack and HT leads. There are four spark plugs across the front of the engine bay that look straightforward to access.



9 An oil pressure sensor (switch) is next to the top timing chain cover (black plastic) and close to the engine oil filler cap.

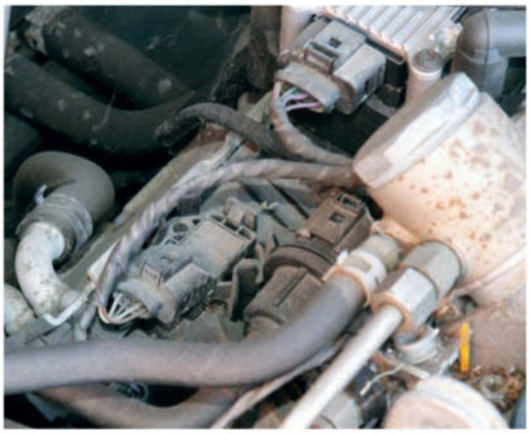


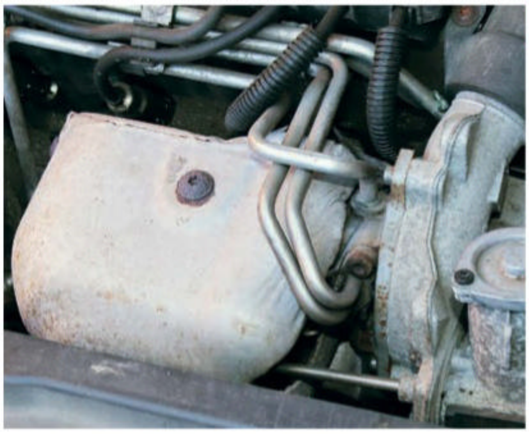
10 To the right of the coil pack (when looking from the front of the vehicle, over the engine bay), there's a mass airflow (MAF) sensor secured to the plastic inlet manifold.



11 ◀ Removing the induction system (air filter housing and its pipework) reveals a throttle body to the right of the coil pack, which includes a throttle position sensor (TPS).

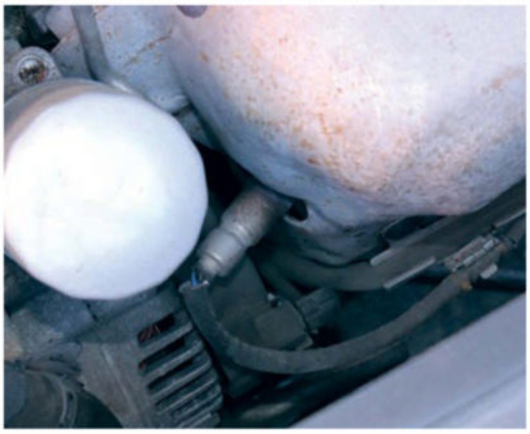
12 ▶ A boost pressure sensor is fitted to the plastic inlet manifold and located to the left of the coil pack. We initially mistook this as a manifold absolute pressure (MAP) sensor, but its part number states it's a boost pressure sensor. Whilst they both measure pressure, a MAP sensor's reading is relative to atmospheric pressure.

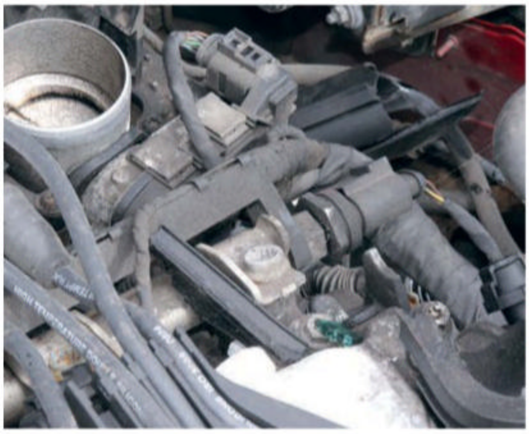




13 ◀ A turbocharger is located at the front of the engine bay, concealed by a heatshield. See *Fault 5* for more information on problems with its actuator.

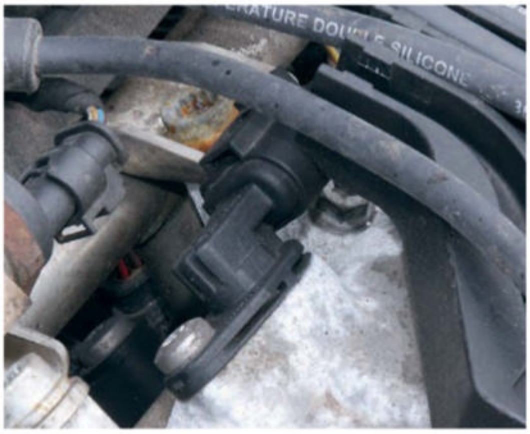
14 ▶ A pre-cat oxygen sensor can be seen and accessed from the front of the engine bay, below the turbocharger, whereas the post-cat oxygen sensor is accessible from underneath the vehicle.





15 ◀ Across the engine and adjacent to the spark plugs, there's a fuel rail with a fuel pressure sensor on the nearside end and a high-pressure fuel pump near the centre of the engine bay. Whilst the fuel delivery pressure is between 4 and 7 bar, the main pump delivery pressure is up to a maximum of 120 bar. See *Fault 1* for potential problems.

16 ▶ A camshaft position (CMP) sensor can be seen close to the coil pack and the high-pressure fuel pump. This engine has one overhead camshaft.



THANKS TO
AES York Limited
01904 780149
autoelectricsyork.co.uk

Diagnose Dan's
Technical Support
Base (TSB)
www.diagnosedan.com

SKODA FABIA TSI FAULTS

OIL DILUTION

FAULT 1

▶ Mark Shipman at AES says that the 1.2 TSI engine adds excess fuel to the engine during cold running. This helps to warm up the engine and its components, and once the engine is warm, the excess fuel should be burnt off. However, if the vehicle is only used for short runs, the excess fuel won't get burnt and will remain inside the combustion chambers, leaking past the piston rings and dropping into the engine oil. Consequently, the engine oil level will increase because it is diluted with fuel. This in turn affects the lubrication of the moving parts in the engine, such as the bearings, but also the timing chain (see the next fault for more details) and the turbocharger. Mark recommends checking the oil level weekly and if it increases, have it changed. If a vehicle is mainly used for short runs, it's worthwhile conducting an oil and filter service every six months or less.

Diagnose Dan's Technical Support Base details a potential leak from the high-pressure fuel pump, which escapes into the inlet manifold, making the fuelling over-rich and diluting the engine oil. Plus, fault codes relating to the fuel trim and the system being too rich may be logged, along with misfires.

TIMING CHAIN PROBLEMS

FAULT 2

▶ *Fault 1* describes an engine oil-related issue that can affect the timing chain's lubrication, resulting in failure of the tensioner, stretching of the chain (making it noisy) and the risk of engine timing problems, misfires or even engine failure. Even if the engine oil dilution isn't an issue, problems with the timing chain's tensioner failing appear to be common, so listen for excessive noise from the timing chain area. Removing the plastic upper timing chain cover enables the chain to be inspected, but not the tensioner or its plastic guides. febi offers a complete timing chain kit (part number 172944), which costs around £120. Diagnose Dan warns that if the timing chain has stretched, the timing between the camshaft and crankshaft is interrupted, but initially it may not be logged.

CLUTCH CHANGE

FAULT 3

▶ Mark Shipman has discovered that during a clutch replacement job, if the engine is unintentionally rotated when tightening the mounting bolts for the clutch cover, this will rotate the timing chain anti-clockwise and risks altering the timing. He recommends locking the flywheel to prevent the crankshaft rotating when replacing a clutch.

MISFIRES

FAULT 4

▶ Start with the obvious, such as the spark plugs and HT leads, which are easily accessible. Diagnose Dan's Technical Support Base outlines some straightforward symptoms, such as damage to a HT lead and an incorrect spark plug. It notes that, "If the engine has permanent combustion misfires, the injection will be interrupted (until the next ignition cycle) and fault code P130A00/11836 will be stored."

TURBO ACTUATOR FAILURE

▶ With the turbocharger mounted at the front of the engine, there's an actuator which can fail, resulting in the engine management light appearing on the dashboard and raising a fault code, such as P334B (described as actuator mechanical failure). The actuator can be replaced on its own.

FAULT 5

LOW OIL PRESSURE

FAULT 6

▶ According to Diagnose Dan, low oil pressure can arise if the oil filter has been incorrectly replaced. It has a non-return valve and two gaskets to prevent oil leaking onto the alternator upon removal. If one of these gaskets is left in situ (so three gaskets are fitted with a new oil filter), the spring-loaded non-return valve will be permanently open, resulting in low oil pressure (there should be over 2 bar when the engine is cold). A new oil filter should be tightened to 20Nm.

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FORD 1972-1997 VARIOUS PARTS. Chassis, engine, body parts, Puma Mk1, Cortina Mk5, Escort, Transit, Fiesta, Ka, Granada. 7 boxes of spares, clearing my Dad's garage (after his passing). **£80** to clear (offers?). **07856 284613** for further info. Essex.

CARS FOR SALE

JAGUAR X-TYPE DIESEL. 2009. 114,000 miles. Light blue, cream leather interior. 2 lady owners, full service history, MOT, e/seats, aircon, sat-nav. In showroom condition. **£1995**. **07527 446242**. Wales.

VAUXHALL ASTRA. 1.6L. 1989. 5 door Estate, petrol, 5-speed gearbox. On SORN, non-runner, two owners from new. **£1500**. **01932 225027**. Surrey.

VOLVO 240 SE ESTATE. 1992. Garaged 9 years. No MOT but in running order. Many spares. Buyer collects. Please phone after 6pm weekdays. **£1500**. **01316 572108**. Edinburgh.

CHEROKEE JEEP LIMITED 1998. 4.0. 105,000 miles. MOT until April 2026, no advisories. New front discs and calipers, new front driveshaft UJ's. Full leather. Four-wheel-drive works, no rust. **£4250**. **07775 712510**. South East.

FORD COUGAR. 2.5. X-pack. Last owner 20 years. 78,000 miles. Recent brake overhaul and new driveshaft. 12 months MOT. Nice car. **£1825**. **01597 851539**. Powys.

MORRIS MINOR TRAVELLER. 1963. Underneath needs welding. Brakes poor. Engine OK. Needs TLC. **£1100**. **01773 826123**. Derbyshire.

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- TOPDON JUMP-STARTER & AIR COMPRESSOR reviewed
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Event Review

26th July, 2025

HAGERTY
FESTIVAL OF THE
UNEXCEPTIONAL
CONCOURS DE L'ORDINAIRE
FN65 BCU

FOTU included some new displays for 2025, including a future unexceptional cars display, which included this Dacia Sandero – the black bumpers from which adorned the base model, once the cheapest new car in Britain.

HAGERTY FESTIVAL of the UNEXCEPTIONAL

As a fan of unexceptional cars, **Rob Marshall** returned to the *Festival of the Unexceptional* over the summer to join a new generation of DIY car repairers.

▶ Throughout history, older generations have criticised and mocked those beneath them. This dubious tradition continues today. Gen Z are work-shy, mentally unstable, entitled, oversensitive, humourless and unable to determine whether they are Arthur, or Martha. With zero interest in car ownership, let alone having the will to raise their eyes from their smartphones and even contemplate getting their hands dirty, what hope is there for the future of DIY car repairs? As it turns out, the *Festival of the Unexceptional*, shows that the future is looking bright.

A new generation

Judging by the considerable number of cars being piloted through Grimsthorpe Castle's gates, which have been on the planet for longer than their drivers, the *Festival of the Unexceptional* (FOTU) has captured a zeitgeist among under-30s. After all, even 'youth' need to get about, meaning that the desire to pass a driving test still burns bright, despite test backlogs making it almost impossible for learners. Even so, FOTU highlights the smart thinkers among Gen Z, who have shunned monthly-payment financed electro-boxes for analogue ownership.

One of the major attractions is the relatively low purchase cost, compared with newer models. While those cars that are not (yet) VED exempt are relatively expensive to tax, the owner is released from the monthly contract and final balloon payments. Furthermore, as Hagerty is keen to promote, many of these older cars are cheaper to insure.

Being practical

Naturally, DIY is part of the ownership experience. The top two winners in

MOTOR MUSEUM
UNEXCEPTIONAL
ECV3
BMC 9X

The British Motor Museum presented a trio of former British Leyland prototypes. The blue 9X hatchback was shorter, lighter, faster, quieter and roomier than the Mini it should have replaced. The green Triumph SD2 was designed to replace the ageing Triumph Dolomite; many enthusiasts are relieved that it did not. Finally, the ECV3 was Austin Rover's 1981 vision of a futuristic eco car.

SIERRA 2.3 D GL
SAPPHIRE
E43

FOTU is a show that celebrates base model cars. Here, a Sierra diesel is considered more desirable than a Sierra Cosworth. A slight change for this year was classic and unexceptional cars being grouped together on the lawns.

Our Rob Marshall participated this year, driving his very unexceptional Triumph Toledo 350 miles to Grimsthorpe Castle and back.

Some commentators viewed the general ticket price of £25 per person as excessive. Yet, as FOTU '25 attracted 4000 people, one could argue that the pricing is about right.

the tongue-in-cheek Concours de L'Ordinaire are testament to this. The judges awarded the runner-up prize to Callum Bailey's base model 1999 Ford Mondeo, which he saved from being turned into a banger racer. His hard work was rewarded at the show, considering that his total outlay was only £6000, a paltry sum in the world of trophy-winning restorations.

First prize, however, was awarded to 22-year-old Simon Packowski's bottom-of-the-range Skoda Favorit, which he saved from being scrapped. Once the failed cylinder-head was resolved, Simon spent considerable effort making the car look like new, with the judges being especially captivated by his dedication, such as travelling over 1000 miles to collect a set of original headrests. The public was impressed too, bestowing the car with the People's Choice Award.

From hobby to living

Recognising the need to grasp and grow this youthful enthusiasm, Hagerty's charity partner, StarterMotor, was present to highlight the career opportunities. Realising the skills shortage and generational gap in not just the garage repair trade but also the vintage and classic car industry, StaterMotor's focus is to provide young enthusiasts with work experience, apprenticeships and even employment.

Speaking on the FOTU's main stage, StarterMotor's General Manager, Steve Cootes, explained that the charity is engaging actively with schools, including running careers events at Bicester Heritage to find 'future champions' of the industry and to facilitate access to older cars.

The ultimate Concours de L'Ordinaire winner was Simon Packowski's stunningly-standard 1992 Skoda Favorit.

One way that the charity is reaching out to Gen Z is through ambassadors. Gracie Haddon (21), a recent marketing and advertising graduate from the University of Lincoln, highlighted the ecosystem of career opportunities that extend beyond repair and restoration, into areas including marketing and finance. She also acknowledged the large number of under-30s present and emphasised the importance of events, such as the FOTU, as fostering interest in driving, preserving and enjoying older vehicles.

For more information, check out: **https://startermotor.co/**

More than just cars in a field

Also present on the stage were Smith and Sniff, the podcasting petrolhead duo, who kept the crowds entertained with interactive games that included Wheeltrim of Misfortune, Talbot Tombola and What's My Car Again? Compared with previous years, there was a welcome increase in traders, especially those selling unexceptional cars, although not necessarily for unexceptional prices. Thankfully, there was a decent selection of food stalls and even a bar for the non-drivers. The British Motor Museum had a greater presence, too, with its head of collections, Stephen Laing, focussing on British Leyland prototypes that failed to make production.

2025's FOTU was another success for Hagerty, who commented that the younger owner demographic is evidence of a new movement in car culture. It has managed to give the show more of a festival feel, one which celebrates cars that were once mundane but are now special. Yet, as with all events, it needs to evolve. One challenge it should look to address is adding more attractions that would reduce the chance of cars driving off several hours before the show finished. Even so, if you prefer Fiats to Ferraris and relish the chance of seeing an immaculate Nissan Stanza next to a Talbot Solara, then the FOTU is for you.

FOTU was supported by a new generation of car enthusiasts. Pictured, for instance, is a pair of engineering students and their respective Citroën BXs. Many younger attendees drive their 'unexceptional' cars daily – and repair them themselves.

Our Cars

Andrew Rolland

Special Contributor

Service x 2

Another year has passed which means it's time to service my wife's 2015 Ford Kuga Titanium X 1.5i. You may recall that I had a battle with removing the old oil filter at the previous service, I'm pleased to report that because I fitted the febi filter as per the manufacturer's instructions, it was easily removed a year later using my bespoke Sealey tool. This time around, the four-pot EcoBoost engine was due some new spark plugs. This proved to a real joy to behold.

The spark plugs are hidden from vertical line of sight by the scuttle panel. I'm not removing a scuttle panel to remove something as simple as spark plugs. The ignition coils are bolted down which needed a ¼in drive 8mm socket to fit between the coil body and wiring harnesses. These bolts required a surprisingly large effort to crack them loose, but thankfully they all come out OK – and the wiring to each coil was easily unplugged. The coils lifted vertically out of each spark plug recess. I blew out each spark plug hole with compressed air before attempting to remove each plug to try and prevent any debris falling into the cylinders. Each ignition coil has a dog leg to it, which means my spark plug socket and universal joint needs to be fed down into a spark plug recess that I can't see. I wasn't going to risk not using a universal joint in the 'drive system' as if you don't use one, you run the risk of snapping the plug with any applied force that isn't a rotational one. After a bit of wiggling and jiggling, I got the spark plug socket engaged over the plug and wound them out. These plugs are only meant to be torqued to 13Nm but in a running theme on this car, they had been overtightened.

BMW 535i major service

It was also that time of year again when my 2013 BMW 535i needed a service. This was to be the major service where all the filters are changed along with the spark plugs. A full set of febi filters were acquired and 7 litres of febi 5W-30 Longlife Plus oil. I also took the opportunity to take a sample of my sump contents for testing. The N55 engine in my BMW has 69,000 miles on it, and I plan on doing a lot more on it assuming its healthy, as in the bottom-end doesn't develop a sinister sounding knock. I had recently read a horror story online of a fellow 535i owner whose engine developed a knock, and his oil filter was full of metal. Granted he had 'modified' his engine and it was on higher miles. For peace of mind, I wanted my oil tested for metal content which would give an indication of wear of things like main and big-end bearings, etc. If these are in good condition, there will be little metal in the oil.

Within a week of the sample being received, I got the results of the analysis. I was pleased to read that it was classed as "satisfactory", which means that all is well with the oil and more importantly for me, the engine. The amount of metal detected in the sample was low, meaning that the internals of my engine haven't worn significantly. The engine oil tested was febi 5W-30 Longlife Plus installed 7000 miles and just over a

◀ **The old mirror glass from my BMW helped me see where the spark plugs were hiding in the Kuga's EcoBoost engine.**

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▶ **A new Blue Print sump plug was fitted to the Kuga which has an inbuilt rubber O-ring under the flange. It costs a few pounds, just replace it.**

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Freshly washed and serviced, both ready for another year's motoring. 2013 BMW 535i – my daily driver with a healthy engine, and after another service, it's running beautifully. 2015 Ford Kuga 1.5i AWD. My wife's car. A decision is being made in the Rolland household if the Kuga gets to stay another year. Watch this space.

A pile of quality febi filters to go into my BMW along with a new sump plug and oil level sensor O-ring.

year previously. BMW state that the oil service interval for my engine is 17,000 miles or every two years, whichever comes first. As regular readers will know, here at *CM*, we all recommend shorter oil change intervals than that. I would like to point out that my report back from the testing house also states, "Lubricant fit for further service" so that's top marks to febi for the quality of its oil and clearly it will last longer as per the BMW service interval. This was welcome news as the sump has been replenished with 6.5 litres of the same febi oil!

And, as promised in my *Our Cars* March 2025 article, the replacement of my mate's 2015 BMW 520d lower arm went without a hitch. He'd been advised by yours truly to wire brush every bolt thread and soak in Plusgas before we went anywhere near the nuts, some of which are torqued up to 265Nm on assembly. My impact wrench with a fully-charged 5Ah battery made short work of undoing them, thank goodness.

SATISFACTORY***SATISFACTORY**

SYMPTOMS:	Wear metal levels and physical properties within our recommended limits.
DIAGNOSIS:	Unit satisfactory. Lubricant fit for further service.
ACTION:	Re-sample at scheduled intervals. No fuel detected.

STATUS **NORMAL**

PHYSICAL PROPERTIES

Viscosity @ 40°C	cSt	69.39
Water Content	%wt	0.0
Total Insoluble Matter	%	0.8
Total Base No	mgKOH/g	2.45
Fuel Detected	%	0
Fuel Dilution	>135c	0

SPECTROCHEMICAL ANALYSIS

Iron	ppm	38
Chromium	ppm	0
Aluminium	ppm	10
Molybdenum	ppm	0
Copper	ppm	3
Lead	ppm	0
Tin	ppm	0
Nickel	ppm	0
Silicon	ppm	11
Sodium	ppm	5
Boron	ppm	62
Vanadium	ppm	0
Calcium	ppm	1020
Phosphorus	ppm	603
Zinc	ppm	716
Magnesium	ppm	354
Barium	ppm	0

All within acceptable limits which is reassuring for me, and shows the benefits of regular oil changes with good quality oil such as from febi.

Oil Lab
The Oil Lab
Delivery Unit 2
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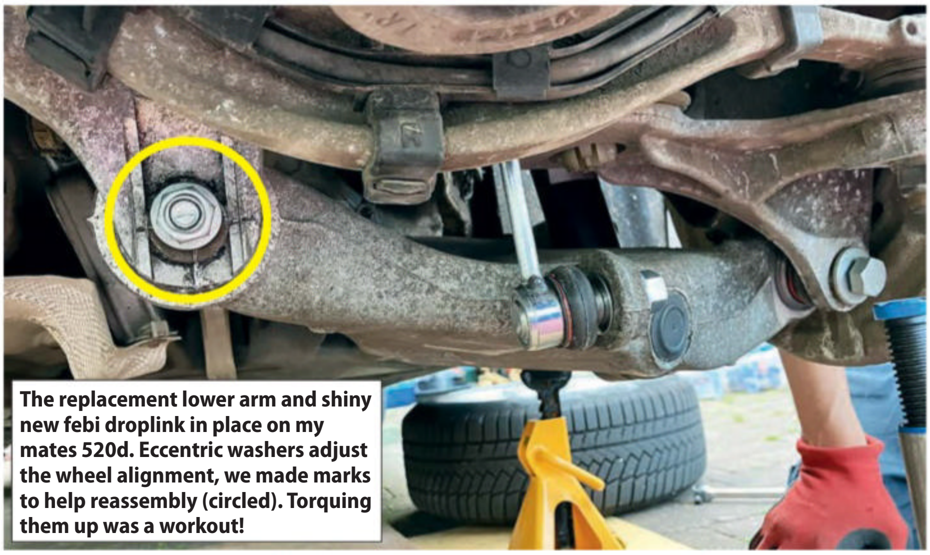
Bretby Business Pa
Ashby Road
Burton on Trent
DE15 0YZ
Non Flammable, Non Hazardous Sample for Analysis

A sample of used febi oil was collected and sent off to a testing laboratory. While several bottles of new febi 5W-30 Longlife Plus waits to be poured into the BMW sump.



The replacement lower arm and shiny new febi droplink in place on my mates 520d. Eccentric washers adjust the wheel alignment, we made marks to help reassembly (circled). Torquing them up was a workout!

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Our Cars

Rob Hawkins

Special Contributor

Bring back the shine

With its lack of a clutch pedal, Rob's first attempt at having his MX-5 MOT-tested was a worthwhile fault-finding exercise. A hole in the exhaust, a dodgy headlight and an ineffective handbrake were some of the failure points.

It was the height of embarrassment when I rolled my 1998 MX-5 Mk2 onto the MOT test ramp at my local garage (MJ Motors), only to apologise to the tester because I suddenly had no feel in the clutch pedal. I'd occasionally found the clutch pedal's biting point was reduced when I was manoeuvring the vehicle, which was quickly remedied with a couple of pumps. Assuming the clutch fluid and slave cylinder probably needed renewing, I'd hoped the problem wouldn't bite me in the bum when I least needed it. How wrong could I be?

Fortunately, the MOT tester was happy to conduct the test so that at least I could see whether there would be any more fail points to fix. Sure enough there were. The list included a hole in the rear exhaust silencer, a dodgy nearside headlight connection, poor emissions (caused by the exhaust) and an ineffective handbrake.

Having to leave the MX-5 at MJ Motors and return the next day, to everyone's surprise, the clutch issue was no more. Had the fluid overheated? We decided to extract as much of it as possible to refresh it in the hope this would help. However, I now have a new slave cylinder and master cylinder from febi, just in case.

As for the other failure points, the handbrake issue was easy to fix and I always carry the essential 4mm Hex tool in the glovebox so that I can adjust the offending rear caliper. A couple of turns had the handbrake efficiency restored.

The hole in the rear exhaust silencer meant it had to be replaced. I'd originally fitted it in 2013, so it had lasted well, and had to remove it in 2017 when I renewed the mid-section, so nothing was too difficult to undo. Mazda probably went overboard in fitting three rubber hangers, meaning I had quite a battle with a pry bar, but otherwise it was a straightforward job and, to my amazement, I didn't need to use any exhaust paste.

Whilst repairing the MX-5 at MJ Motors, I asked whether I could quickly drain the engine oil and remove the filter. It only takes a few minutes when you have a ramp.

It was a case of second-time lucky for the MOT test. The emissions passed, thanks to the new exhaust silencer. The dodgy headlight was fixed with contact cleaner and all was well, so I returned home only to find a few days later, the clutch pedal's biting point problem had returned, but it wasn't as bad as the time when I only just made it onto the MOT test ramp. I'll start with renewing the slave cylinder.

Old rear silencer had survived for 12 years and was straightforward to replace on a ramp at my local garage (MJ Motors).

Jacob at MJ Motors helped to extract most of the old clutch fluid that was particularly grubby looking.

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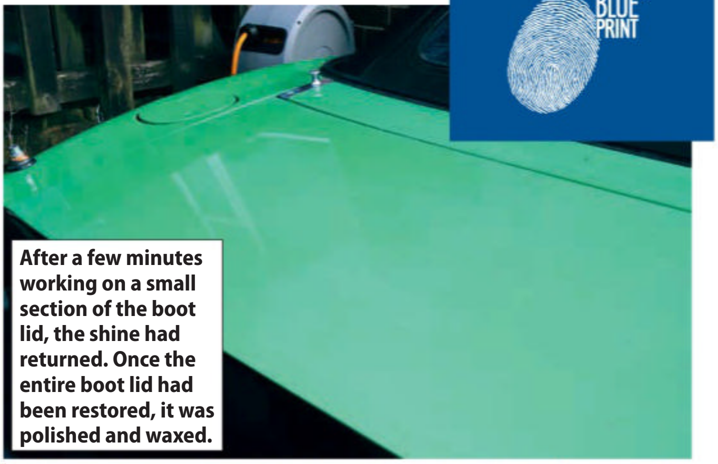
Faded paintwork on the boot lid was revived using a DeWalt rotary polisher with a pad and cutting compound from Car Gods.



After a few minutes working on a small section of the boot lid, the shine had returned. Once the entire boot lid had been restored, it was polished and waxed.

Sealey's cordless rotary polisher was just as straightforward to use as the DeWalt.

Faded paintwork

One of the more successful jobs I've tackled recently concerns the paintwork. The current Porsche Viper Green exterior has lasted for seven years, and my only concern is that the glossy-looking finish on the bonnet and boot lid have faded. Surprisingly, the tops of the wings, especially the rear wings, aren't as bad, so I'm not sure I can solely blame the problem on sunlight damage.

Cheekily, Rob seized the opportunity to drain the engine oil whilst his MX-5 was raised on a ramp at MJ Motors.

After speaking to various specialists, the general conclusion was to use a mild cutting compound to help restore the faded paintwork, then protect it with polish and wax. I contacted Rochdale-based Car Gods (cargods.com) for some recommended products and they sent me a 1-litre bottle of their Sectus 9K compound and a suitable pad.

Based on my moderate experience with polishing and using polishing machines, Matt at Car Gods recommended I used a dual-action or random orbital polisher. However, I still had a couple of the cordless rotary polishers from Sealey and DeWalt after the product test I'd completed in the June 2024 issue of *CM*. He warned that whilst these are effective tools, they are perhaps better suited to an experienced person because there's a greater risk of burning through the paint and causing damage. We concluded that I needed to be careful and that I had been warned. Plus, I was keen to get to grips with these rotary polishers and had seen a few experienced bodyshop professionals using them with good results.

After washing and drying the bonnet and boot of the MX-5, I used the DeWalt rotary polisher on the rear and Sealey's on the front. I used the medium-cut compound pad from Car Gods, applying four small dots of their cutting compound, then spreading it across a surface of around 40x40cm, before carefully switching on the polisher and lowering it evenly onto the paintwork. Working in straight lines (back and forth and up and down), I kept the polisher and its pad level with the paintwork and tried to maintain an even action. The bonnet has plenty of curves, so it wasn't as easy as it sounds, and the rear scuttle in front of the boot lid wasn't so easy to access, so I used a clean cloth with a little cutting compound instead.

The cutting compound soon restored the paintwork to a shine, so after wiping off any residue, I applied a polish and also tried some wax. The wax wasn't so successful. It's an old tin I've had in the garage for a few years, and it seemed to leave a residue that was awkward to remove with a clean cloth, requiring lots of elbow grease. Fortunately, I have a new unopened one from Autoglym, so I'll break into that soon.

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In my Humble Opinion

Mike finally gives in to an old boys gathering event invite – and leaves literally feeling humbled!

Going Rover it all one more time

Even though it's been a good twenty years or more since I moved away from the Midlands, it seems like I spend more time in that vicinity than I do in leafy Sussex where I have resided for the past seventeen years. My work life finds me regularly pounding up and down the M40, and a good deal of my private mileage sees me doing the same bloody journey. I wouldn't like to try and do the journey with my eyes closed but – well, you get the gist, I'm sure.

Of all the places between Beaconsfield and south Birmingham along what I regard as England's second most boring motorway (after the M11 but I'm open to other people's thoughts on this one) it's the hamlet of Gaydon where you'll find me most. Home to the British Motor Museum, Gaydon is a nice little place and a former RAF bomber command centre – a place of utmost strategic importance, especially during the cold war era.

Vickers Valiants and Vulcans gave way to BL technology and a test track. In more recent years became home to Rovers historic vehicle collection. Now called the British Motor Museum, it holds one hell of a display of vehicles, not to mention holding the utterly stunning Jaguar Daimler Heritage Collection. If you haven't been for a good few years since its extension and update, or have never been at all, you really must go there! Young or old there's so much to do and see. I rarely need an excuse to go there. During the spring and summer weekends, there's a themed gathering going on in the vast car park celebrating anything from cars to trucks to buses – genuinely something for everyone.

And for me, that's half the problem you see. Getting up to Gaydon is a good two+ hour schlep, getting the timing or the traffic wrong and you're looking at more than three. If you have any exposure to the journalistic side of automotive (especially with older stuff) you get invited to all sorts of retro car (and bus) shows, not just at Gaydon but everywhere else too. Events take place at Beaulieu, Coventry Transport Museum, Cofton Park Longbridge – just to mention a handful. To save my sanity and carbon footprint, I need to be selective regarding which shows to go to (or support). Otherwise, my spare time is quickly hoovered up and my fuel tank remaineth empty.

I found myself there again only just recently. This time it was more of a meet and greet and chew the fat kind of function. It was a gathering of former staff, engineers, designers, and managers of the companies born out of BMC right through to the final MG Rover days. There's been a few of these gigs previously and even though I'd been invited along, I had always politely declined owing to my own experience being at a dealership level rather than the plants and offices that included Abingdon, Canley, Cowey, Longbridge and Lode Lane in Solihull. After receiving yet another invite from the organiser – John Batchelor, a former Rover engineer and legend of the Rover 200 Owners Club, I decided to romp up the M40 once again and actually join this one.

It turned out to be the best attended one yet. Initial figures suggested 50 or so people were coming along but by 11am there was getting on for almost 100. I knew quite a few of the lads and lasses who came owing to the DVD on the Rover 75/MG-ZT I was heavily involved with. Of particular note it was nice to catch up with both Richard Woolley and Geoff Upex who headed up the styling departments of Rover, with Richard going on to a senior level being Jaguar Land Rovers Director of design. One thing that does always shine through is the pride these people still have for their past creative inputs. Many folk, often wrongly, think of the crud this company once produced. Vehicles like the Allegro and Marina still come in for a great deal of flack with most of it being rather unfair and either written or filmed about by people who weren't even born, let alone around, when the last examples left the factories.

To digress, nothing makes my wee-wee boil more than an eighteen-year-old video blogger spouting off about how awful some cars could be back in the seventies or eighties. Mostly their intelligence is sourced from other folks' ramblings or Wikipedia. At this point it's worth remembering a well-known phrase: "one man's trash is another man's treasure". Well at this gathering, it was refreshingly journo free finding everyone there had worked at the coal face. They'd all done their bit and were happy to give up their Saturday to catch up with former workmates and people they didn't even know.

At a time where our industry is vanishing quicker than a rat up a drainpipe, it's very important to catalogue the knowledge, get people talking and get our thoughts and experience down on a hard copy for our future family members or interested people to enjoy and learn from. Far from me to suggest it's about living in the past; it's more about telling the future generations about what us old gits once got involved in within the industry we call motor.

I ended up feeling deeply honoured and chuffed to bits to attend – and be in such proud company. If John decides to organise another, I won't even hesitate to attend the next one – so long as there's tea and biscuits too.

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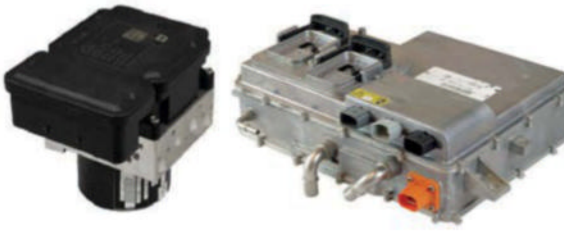

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